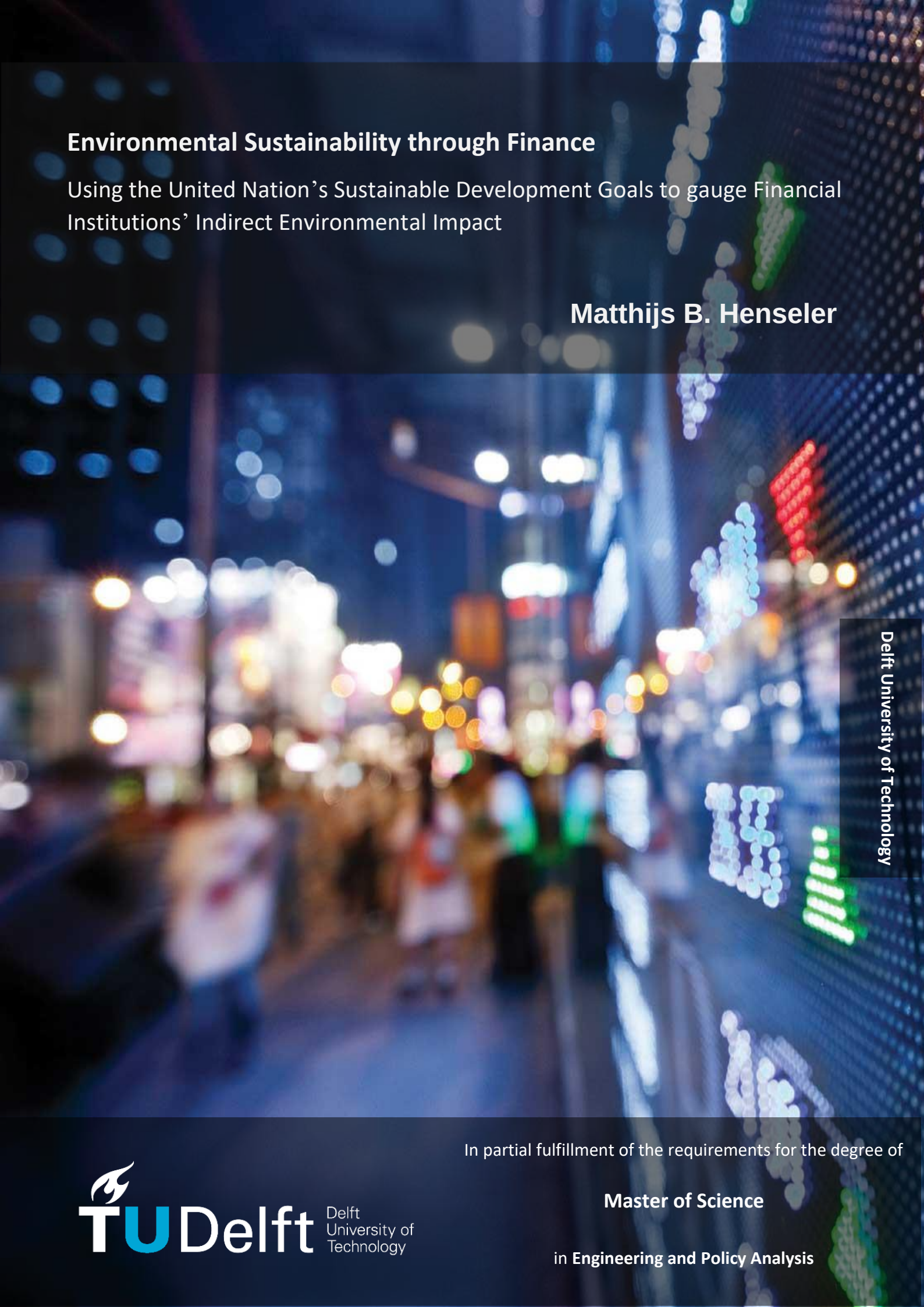

Environmental Sustainability through Finance

Using the United Nation's Sustainable Development Goals to gauge Financial Institutions' Indirect Environmental Impact

Matthijs B. Henseler

Delft University of Technology

In partial fulfillment of the requirements for the degree of

Master of Science

in **Engineering and Policy Analysis**

TU Delft Delft University of Technology

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By

Matthijs Benjamin Henseler

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Student Number: 4514661

Chairperson:	Dr.ir. B. Enserink	Section of Policy Analysis
First Supervisor:	Dr. J.A. Annema	Section of Transport and Logistics
Second Supervisor:	Dr.ir. C. van Daalen	Section of Policy Analysis
First External supervisor:	E.O. de Groot BSc MA	Section of Policy Analysis
Second External supervisor:	D. Korslund MBA	Global Alliance for Banking on Values

Preface

The pages that follow contain the outcome of a six-month research, conducted between February and July 2017. This research, titled ‘‘Environmental Sustainability through Finance: Using the United Nations’ Sustainable Development Goals to gauge financial institutions’ indirect environmental impact”, has been written in the partial fulfillment of the MSc. Engineering and Policy Analysis at Delft University of Technology. Although this thesis was not commissioned by anyone, I was inspired to conduct the research by the Global Alliance for Banking on Values (GABV) where I simultaneously completed an internship. I would like to express my deep gratitude to this great organization for their guidance and commitment to me as an intern.

Combining a passion for sustainability with a relatively newfound interest in economics and finance, I decided to write my master thesis on the cross-section of both. I believe the financial sector to be uniquely positioned to contribute to a more sustainable future, given its influence in every other sector of the global economy. I was introduced to the Sustainable Development Goals of the United Nations for the first time during a workshop at the European Youth Parliament in Strasbourg in the spring of 2016. I quickly became enthused to incorporate the SDGs into the heart of my thesis and was strengthened in my enthusiasm by the positive responses from my GABV colleagues regarding the combination of sustainability, the financial sector and the SDGs.

The outcome of this thesis is a prototype tool, designed to assess the indirect environmental impact of financial institutions. The prototype tool is the result of a literature review, interviews with several different yet equally qualified actors in the field of sustainable finance and many hours of programming. The outcome of this thesis is analytical in its nature, technical in its execution and exceptionally relevant in today’s world, where civil society is increasingly demanding that their financial resources are managed sustainably.

If not for my first TU Delft supervisor, Jan Anne Annema, writing this thesis would have been a lot harder. Our meetings were short but effective; I always left your office feeling more in control of my research than when I entered and for that I would like to thank you. David, I greatly value all your efforts in aiding me with my thesis. Regardless of circumstances, you offered help on every possible corner. By reaching out to experts in your own professional network, you made all the interviews possible, which have been so critically important for this thesis. For occasionally making the past half year not only more bearable, but even enjoyable, I would like to ultimately thank my dear friends and co-students Anil, Georgios, Juan, Maurizio, Pedram and Siva.

Lastly, given that the two worlds meeting in this thesis are fairly distinctive, I have tried to write an accessible thesis; interesting for those from a financial sector background as well as for those more used to reading systems design and engineering papers. For those only interested in the recommendations and conclusions of this research, I recommend reading the executive summary as well as consulting the final Appendix.

Matthijs Henseler
July, 2017

Executive Summary

Context

Sustainability is increasingly becoming more important for financial institutions. Since the beginning of the great financial crisis in the fall of 2007, the financial sector has known troubling times and has yet to return to its pre-crisis level of stability. It has been shown that sustainable banks are not outperformed by traditional banks in conventional financial sector metrics such as risk-adjusted financial returns, while at the same time do outperform traditional banks when it comes to non-conventional financial sector metrics such as triple bottom line assets to total assets or real economy revenue. Moreover, sustainable banks have shown to be stable during economically troublesome times. The combination of stability, while at the same time having a positive impact on environmental and social factors has been picked up by consumers, resulting in an increasing market share for sustainable banks.

The increasing popularity of sustainable banks did not go by unnoticed; conventional financial institutions are increasingly improving their efforts when it comes to sustainability reporting. Surely an uptake of sustainability in reporting efforts is not a bad trend. However, when sustainability practices are integrated more deeply in the marketing department of a financial institutions than in their balance sheets, consumers are left facing a complicated decision. Given the popularity of the United Nation's (UN) Sustainable Development Goals (SDG), they are thought to be a promising universal communications tool when it comes to sustainability performance of large enterprises – financial institutions included. Therefore, this thesis investigates the opportunity to systemically, transparently and objectively use the SDGs to gauge indirect environmental sustainability performance of financial institutions.

Regardless of the SDG's popularity, it is not clear what a tool capable of assessing financial institutions' environmental performance in the UN's common language for sustainable development looks like. Therefore, this thesis had the following objective:

> "To introduce a prototype system, also referred to as a tool, which is capable of incorporating components of the SDGs so that they may form the criteria based on which financial institutions' core business activity, their balance-sheets, can be assessed in terms of environmental sustainability."

By addressing this objective, this thesis also contributes to the reporting gap identified in the Sustainable Development Goals Investments (SDGI) agenda, composed by 18 renowned Dutch financial institutions. The SDGI agenda recommends an uptake of sustainability standards and to clarify the "*SDG data ambition and approach to ensure private sector contributions to the* [UN's] *2030 Agenda*" (SDGI Agenda, 2016, p. 11).

Method

A systems design approach inspired on the work of Sage and Armstrong (2000) has been chosen for the actual design of the proposed tool. The design process has been divided into three phases: (1) System Definition, (2) System Design and Development and (3) Verification and

Validation. The first phase lays the foundation for the tool. It concerns itself with the requirements and specifications, logical design and system architecting of the tool. Very important for the system definition phase were the nine interviews that have been conducted among financial sector practitioners, all of whom are also involved in financial sector sustainability. The interview outcomes have been translated into needs – high level system requirements – which form the foundation of the tool that was designed and prototyped in phase two. Additionally, a literature review has been performed to support the decisions made during phase one of the tool design.

During phase two, 'System Design and Development', an actual prototype tool was created. For this task, a combination of Microsoft Excel and Microsoft's programming language Visual Basic for Applications was used. Results of phase one were translated into concrete input, output and calculation conditions, which were programmed into the tool. The result of this phase is a functional tool, capable of using components of the SDGs in an attempt to score the indirect environmental impact of a financial institution.

The third phase covers the verification and validation of the prototype tool. For the verification of the tool a real-world case was applied to the prototype tool. The purpose of this exercise was not to assess the indirect environmental sustainability of the case applied, but to encounter any issues compromising the usability of the tool. The validation of the tool occurred through interviews with experts in the field of sustainability and financial institution assessments.

Literature

The purpose of the literature review was twofold and resulted in two important findings. Firstly, different forms of sustainable conduct in the financial sector were identified. These forms have been ranked in four gradations, based on the extent to which a form of sustainable conduct is out of genuine consideration for the environment. It was concluded that only truly genuine forms of environmental sustainability conduct should be rewarded highly in the tool proposed in this thesis. Secondly, the literature review covered several existing methods to assess sustainability in the financial sector. Best-practices were carried over into the design of the tool proposed in this thesis. Furthermore, this part of the literature confirmed the scientific gap in SDG-based environmental sustainability reporting for financial institutions.

Results

The interviews conducted resulted in the identification of seventeen needs, which were clustered into seven need categories after being corrected for overlap and compatibility. The following seven need categories were essential for the subsequent design steps: (1) Efficiency, (2) Consistency, (3) Objectivity, (4) Transparency, (5) Adaptability, (6) Materiality and (7) Data Availability. The need categories were translated into 19 lower-level requirements. Identifying a total of eight constraints, divided in four constraint categories, concluded the first stage of the System Definition phase: (1) Tool constraints, (2) Input constraints, (3) Process constraints and (4) Output constraints. These design choices are elaborated upon in full detail in section 4.1.1 – Requirements and Specifications.

Using flowchart diagrams, the process of the prototype tool was created step-by-step. The results can be found in section 4.1.2 – figures 5, 6 and 7. During the system architecting steps, it became clear that certain architectural aspects required further specification. Firstly, six SDGs were identified as relevant for an environmental sustainability assessment tool: (1) Goal seven; Affordable and Clean Energy, (2) Goal eleven; Sustainable Cities and Communities, (3) Goal twelve; Responsible Consumption and Production, (4) Goal thirteen; Climate Action, (5) Goal fourteen; Life below water and (6) Goal fifteen; Life on land. In total, these six SDGs consist out of 65 indicators designed to measure the impact on the SDGs. Only indicators that are relevant for financial sector private organizations and have an impact on the environment were implemented in the prototype tool. This means that 65 indicators were reduced to a final list of 24 indicators/criteria used in the prototype tool.

Based on input from both the literature review as well as the interviews, a scoring strategy was devised. The result of this exercise led to a scoring process that rewards any impact on an SDG with the highest score possible. A negative impact on any of the 17 SDGs (not just environmental SDGs) reduces the score to the minimum score possible. Only if a proven effective mitigation strategy is in place, reducing the negative impact, the score can be repaired to range anywhere between the minimum and maximum score possible.

Ultimately, a fully operational tool was programmed in the Excel/VBA environment based on the results from the first phase of the systems design method. Considering that the outcome of phase two is better presented visually, please refer to Appendix VIII which shows images of the output after the tool was applied to a real-world case.[1]

Conclusion

The following main research question was addressed in this thesis:

> "How can the sustainable development goals proposed by the United Nations be used in a systematic approach to objectively and transparently measure the impact on environmental sustainability brought about by financial institutions?"

This thesis as a whole is an attempt to answer this question – the methodology, literature review, results and conclusion all contribute to this purpose. In order to provide a structured answer to the main research question, five sub questions have been addressed throughout this thesis, which collectively answer the main research question. The five sub questions and their answers will be summarized in this section.

(1) How can the financial sector contribute to sustainable development?

The first sub question has resulted in the distinction of four clusters, which have been presented in the *Sustainability in Finance Spectrum* (section 3.2.1). These four clusters represent the different manners in which financial institutions may contribute to sustainable development: (1) Legal compliance and profitability, (2) Risk mitigation, (3) Socially Responsible Investing and (4) Impact and Social Finance.

[1] For a true experience of how the prototype tool works, please visit https://tinyurl.com/ybeusaek.

(2) Which methods currently exist to measure the sustainable development performance of financial institutions?

The second sub question of thesis has shown that currently no universally accepted SDG based assessment method exists for financial institutions. It also shows that the most leverage on sustainable development can be achieved when the primary focus is on the indirect impact of a financial institution. Furthermore, an important finding is that commonly the volume of a loan or investment in relation to the total portfolio is considered and plays an important role in assessment methods for the financial sector.

(3) What are the requirements and specifications of an assessment tool based on the UN's SDGs, capable of assessing environmental sustainability of financial institutions' core business activity?

Firstly, financial institutions willing to improve their SDG impact strategies were identified as the potential users of the proposed tool after several stakeholders of the proposed tool were identified (Appendix XI). Secondly, the needs of this group in relation to an environmental sustainability assessment tool were identified through interviews (section 4.1.1, table 4). Thirdly, the constraints of such a tool were identified and clustered. The results of this process can be found in section 4.1.1, table 5. Fourthly and finally, 19 lower-level requirements were identified for the proposed tool (section 4.1.1, table 6).

(4) What can a working prototype of the assessment tool proposed in this thesis look like?

The system architecting flow charts form the blueprints for the tool (section 4.1.2, figures 5, 6 and 7). The architectural specifications resulted directly in the criteria that can be found in the actual tool. Ultimately, the tool itself forms the best answer to the fourth research question addressed in this thesis.[1]

(5) Is the proposed environmental sustainability assessment tool based on the SDGs usable and valid?

It can be concluded that the current version of the prototype is sufficiently usable. Nevertheless, the usability of the tool is compromised by a few operational errors. These points for improvement can be viewed in section 4.4.3, table 7. The validity of the tool was commented on in an interview with an expert in the field of financial sector assessments. Several ideas to ensure a closer fit to user needs in future versions of the tool were suggested during the interview, which could potentially increase the tool's validity. The results can be view in section 4.4.3, table 8.

Discussion

Several limitations of this research came to light in the discussion chapter. The limitations are in light of both the research resulting in the prototype tool, as well as the prototype tool itself. Firstly, the nine experts interviewed to derive the system needs were all selected based on an assumed affinity with sustainability. Hence, the group of interviewees likely does not reflect the financial sector as a whole. Secondly, the field of sustainable development investing is growing quickly; a literature review conducted six months ago might no longer be state-of-the-art today.

Thirdly, the validation step is conducted on the basis of a single expert interview. This may not have led to an exhaustive list of limitations.

With regard to the tool itself, several other limitations should be mentioned. Firstly, without standardized protocols in place that describe how the protocol should be used, the tool is limited in its usability. Additionally, standardizing the input of the tool increases compliance with needs such as efficiency, transparency and objectivity. Secondly, the current version of the tool only uses qualitative data, whereas a combination of both qualitative and quantitative data is deemed ideal. Thirdly, the tool does not yet provide any context for the score. This limits the usability of the tool outcome as it is hard to compare the assessed with its peers. Fourthly, the mitigation strategies and corresponding mitigation factors depend entirely on the opinion of the assessor. This greatly limits the objectivity of the tool outcome.

Recommendations

In an attempt to overcome some of the limitations, a series of recommendations for the development of future versions of the proposed tool are given.

- More nuance should be incorporated in the assessment process. This could be achieved for example through (1) weighing the assessment criteria differently depending on geographic circumstances (2) considering the number of SDGs positively impacted or (3) determining the proportionality of a positive impact on an SDG (e.g. 100% of Company A's revenue positively impacts Criteria B).

- Future versions should include an overview on the scoring page that shows how the assessed performs in relation to its peers.

- It is recommended to include more quantitative data in at least the following three manners: (1) the mitigation strategy should be tracked over time, showing its effectiveness quantitatively; (2) the positive (negative) impact should be quantified in non-monetary terms (e.g. number of households provided with renewable energy); (3) quantify the percentage of a company that actually impacts an SDG positively (negatively).

- Clear protocols should be created, outlining the assessment steps. This will reduce the chance of different assessment outcomes due to different backgrounds of the assessors. For example, the procedure of dividing the asset groups into individual asset groups or up to the point that a 'homogeneous' group of assets has been reached, should be defined less vaguely in a clear protocol.

- It is recommended in future versions to (1) include more environmental criteria and (2) to include more than only environmental criteria.

Finally, it is recommended that more experts are involved in the development of future versions, resulting in a more exhaustive list of needs due to a broader background of the interviewees. The same applies for the validation procedure of future versions; by including more expert opinions, a better picture might be obtained as to how the tool can be improved.

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1. Introduction

Popularized by the club of Rome in 1972, the term sustainability has left its mark on virtually every sector of the economy, a rule to which the financial sector forms no exception. Money is the economy's lubricant and it is widely advocated that the financial sector's influence on money streams should be used for good, for example through financing sustainable development. Sustainable (also ethical or values-based) banks and other financial institutions have taken up this responsibility by exclusively investing in or lending money to projects or businesses supporting sustainable development. But when can an investment or lending decision be deemed sustainable? And should sustainability in the financial sector be treated as a matter of black-or-white, or are there countless of grey areas to be considered as well? This thesis will address the cross-section between (environmental) sustainability and the financial sector.

Throughout this thesis, sustainable development will be defined along the lines of the 1987 Brundtland report, which concluded development to be sustainable only if it *''meets the needs of the present without compromising the ability of future generations to meet their own needs.''* It contains within two key concepts: (1) "*the concept of needs, in particular the essential needs of the world's poor, to which overriding priority should be given''* and (2) "*the idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and future needs.''* (World Commission on Environment and Development, 1987, p. 41). Additionally, this thesis will reduce the scope of sustainability to include only those factors related to the environment.

The motivation for this thesis is to explore the contribution of the financial sector in the transition towards a sustainable economy. More specifically, emphasize will be put on the position of financial institutions within the sustainability framework of thinking and the role the United Nation's Sustainable Development Goals (SDGs) may play in an attempt to gauge the impact brought about by financial institutions. Ultimately, the purpose of this thesis is to devise a system that will allow for a systemic approach capable of measuring the environmental sustainability impact of financial institutions, using the SDGs as a means to objectively and transparently assess the impact. In order to achieve this goal, the following main research question will be addressed:

> *''How can the sustainable development goals proposed by the United Nations be used in a systematic approach to objectively and transparently measure the impact on environmental sustainability brought about by financial institutions?''*

The remainder of this introduction will address the research context (section 1.1), the research problem (section 1.2), the research objective (section 1.3), the social and scientific relevance (section 1.4) and the structure of this thesis (section 1.5).

1.1 Research Context

Almost a decade ago, not just the financial sector but the entire world was shaken up by one of the largest financial crises of all time. Looking back with today's knowledge, it becomes clear that the great financial crisis of 2007-2008 did not come out of nowhere; the increasing instability of the financial markets coincided with deregulatory policies, an increase in transactions between financial organizations, a focus on short-term financial profits and speculation. Financial products such as derivatives and options became more central to the core business model of the conventional bank, meanwhile it was deprioritizing its responsibilities in terms of lending and investing, thereby discouraging participation in the real economy (Dore, 2008; Taylor, 2009; The Economist, 2013).

The crux of the problem became apparent when the price for this failing banking system had to be paid. Considering the sheer size of certain banks at the time of the great financial crisis (GFC), governments saw no other option than to support struggling banks; the alternative being a collapsed financial system impacting masses of individuals and enterprises active in the real economy. Ultimately, this meant that it was society who had to foot the bill. Where in a normal functioning business ecosystem the less performing enterprises may go bankrupt when performing below the market standards, these banks simply had become too big to fail (Kaufman, 2014; Rose & Wieladek, 2012).

Throughout the GFC, there was one group of banks which had weathered the storm particularly well: values-based banks. A values-based bank, or sustainable/ethical bank, is a financial institution conducting standard banking practices such as holding consumer deposits and providing liquidity in the forms of loans and investments to facilitate economic activity. However, a values-based bank does so in the first place to proactively and consciously contribute to sustainable development through the incorporation of sustainability principles in their core business activities (GABV, 2012). Currently, these values-based banks form a minority in the bigger whole of the financial industry, which colors countless different shades of green.

The 'Sustainability in Finance Spectrum' developed in this thesis sheds light on this diversification of the sustainability concept in light of the financial sector. From forced regulatory compliance and sustainability practices as a business driver to genuine desire to do good – sustainability indeed shows itself in many forms. Realizing the existence of this diversity, it becomes important to construct methods for sorting and arranging the many different shades of green of the financial sector. Without, consumers are left defenseless against massive advertising budgets of financial institutions overselling their sustainability intentions. This takes us to the core of this thesis: objectively, transparently and systemically assessing the sustainability of financial institutions' core business activities – their balance-sheets.

1.2 Research Problem

Appearances have historically been important in the financial sector. Marble facades and spacious lobbies have traditionally been common characteristics of banks, serving the purpose of inspiring a sense of trust in their clientele. Keeping up appearances has remained important

into the 21st century, even though nowadays appearances are no longer limited to the physical attributes of a bank. Appearances matter equally when it comes to corporate social responsibility (CSR) and sustainability practices. If it is still a question whether sustainability is a good business case, being known as unsustainable surely is a very bad business case. This introduces the incentive for financial institutions to create sustainable and responsible images of their brand, while not necessarily incorporating such principles in the core of their businesses – greenwashing.

The term greenwashing was originally coined by Jay Westervelt, in 1986, who pointed out that the myriads of hotels requesting their guests to reuse their towels in consideration of the environment, actually did so primarily to reduce costs, thereby increasing profits. Nowadays, greenwashing is present in most if not all sectors of the economy, the financial sector again forming no exception (Laufer, 2003; Delmas & Burbano, 2011). Recognizing the demand for values-based and sustainable banking, many financial institutions have begun adopting the principles for responsible investment more enthusiastically in their marketing departments, than in their core business models.

In order to deflect the risk of greenwashing in the financial sector, different tools have been developed with the purpose of measuring how sustainable the practices of financial institutions exactly are. These assessment tools largely focus on different criteria to fund its conclusions, prioritizing certain aspects more than other. It is crucial that banks are controlled in a transparent manner for consumers to be well-informed on matters funded with their money. Without control, escalation of undesirable activities cannot be prevented; a situation that could perhaps guide the world into similar directions as was the case prior to the GFC.

This introduces the topic of how the core activities of financial institutions, their balance-sheets, may be assessed in terms of environmental sustainability. A common approach is to involve the life cycles of products created by the investees of a financial institution. Environmental impact is frequently expressed in CO_2 or CO_2 equivalents. The total impact of a financial institution's balance-sheet then becomes the sum product of all individual investments and their respective CO_2 (equivalent) emissions (Weber & Feltmate, 2016). However, not all environmental impacts can be expressed in terms of its greenhouse gas (GHG) emissions. Other areas, such as land and marine life should be included as well.

More encompassing approaches have been introduced by for example the Global Reporting Initiative (GRI). The GRI's goal is to enable a "balanced and reasonable representation of the sustainability performance of the reporting organization, including both positive and negative contributions" (GRI, 2011, p. 43). It has included several criteria related to environmental sustainability and supports reporting across all sectors of the economy. The organization was founded with the involvement of the United Nations. However, in terms of popularity the GRI's approach pales in comparison to another initiative of the United Nations: The Sustainable Development Goals.

The SDGs were first introduced on the 25th of September, 2015, designed as the successor to the Millennium Development Goals (MDGs). The SDGs number a total of 17 goals, 169 targets and 230 indicators (UN Statistical Commission, 2016). Altogether, the SDGs form the universal

language of the UN when it comes to the topic of sustainable development. Given the recent introduction of the SDGs, a universally accepted approach of incorporating the SDGs in a framework for the environmental assessment of financial institutions has not yet been devised, regardless of their immense popularity in the financial sector. This introduces the research problem addressed in this thesis:

> "It is not clear what a tool capable of assessing the environmental sustainability of financial institutions in the UN's common language of sustainable development, the SDGs, looks like."

1.3 Research Objective

Earlier in the introduction, the motivation for this thesis was introduced. At the cross section of the financial sector and sustainability, it is essential to make clear distinctions between genuine sustainability intentions and marketing-based sustainability intentions. Given the rapid popularization of the UN's SDGs and the massive uptake of those SDGs in reporting efforts of many large private sector enterprises, the SDGs offer a credible and easily accessible language in which to measure the sustainability intentions of financial sector institutions. Therefore, this thesis work will address the following objective:

> *"to introduce a prototype system, also referred to as a tool, which is capable of incorporating components of the SDGs so that they may form the criteria based on which financial institutions' core business activity, their balance-sheets, can be assessed in terms of their indirect environmental sustainability impact"*

This research objective, together with the identified research problem, has led to the creation of the main research question addressed in this thesis:

> *"How can the sustainable development goals proposed by the United Nations be used in a systematic approach to objectively and transparently measure the indirect impact on environmental sustainability brought about by financial institutions?"*

However, before such a tool can be designed, it is helpful to breakdown the main research question in to smaller, more comprehensible parts. Hence, the following sub-questions have been identified:

(1) How can the financial sector contribute to sustainable development?

(2) Which methods currently exist to measure the sustainable development performance of financial institutions?

(3) What are the requirements and specifications of an assessment tool based on the UN's SDGs, capable of assessing environmental sustainability of financial institutions' core business activity?

(4) What can a working prototype of the assessment tool proposed in this thesis look like?

(5) To what extent is the proposed environmental sustainability assessment tool based on the SDGs usable and valid?

1.4 Relevance of Thesis

The relevance of this research is three-fold. Firstly, the scientific literature has not yet captured a universally accepted attempt to link the SDGs to environmental sustainability in the financial sector. Secondly, the social relevance is represented by the ever-growing movement of sustainable banks and other financial institutions, driven by consumers no longer willing to accept that their money funds projects contrasting their own principles. Thirdly, combining the first two points uncovers a need from the private sector to properly report on sustainability related topics, such as environmental sustainability, using the SDGs (hereafter referred to as the reporting gap).

1.4.1 Scientific Gap

This report will contribute to the literature connecting the SDGs specifically to the financial sector. The scientific literature includes a wide array of articles on the SDGs, as well as on sustainability in the financial sector. The literature review (chapter 3), however, will shed light on the underexposed link between the SDGs and the financial sector, clearly identifying the scientific gap. Moreover, literature on sustainability in the financial sector is often limited to the direct sustainability (i.e. operational sustainability) of a financial institution, rather than the indirect sustainability (i.e. core business sustainability, aiming at a financial institution's balance-sheets). The system proposed in this thesis will exclusively concern itself with the indirect environmental sustainability of financial institutions by focusing on (chunks) of their balance sheets.

1.4.2 Social Relevance

The issue is no longer that private sector enterprises, both inside and outside the financial world, are simply not willing to report on their environmental sustainability; myriads of multinationals have introduced some form of sustainability reporting in the past decades. The different styles of reporting, however, make it difficult to value sustainable efforts of an enterprise relative to its peers. It is important that when comparing financial institutions' performance on environmental practices, comparisons must be made based on equal assumptions in order for the consumer not to be misguided. The following (anonymized) example, which was presented during one of the interviews conducted for this thesis, illustrates this idea:

> Two large Dutch financial institutions, Companies A and B, are both eager to communicate their commitment to sustainability towards their clients and the outside world. In order to do so, both companies have set a target of achieving CO_2 neutrality in the near to mid-term future. The layman is easily fooled, however, as only the annual reports and their hundreds of pages make apparent that when Company A refers to CO_2 neutrality of its entire multi-billion-euro balance-sheet, Company B refers only to its operational activities (e.g. office buildings, company car fleet, employee paper usage etc.).

In this example, only Company A's effort reaches the core of its business model. On the *Sustainability in Finance Spectrum* (section 3.2.1, figure 4) Company A would move in the direction of 'the sustainability case for banking', whereas Company B would remain close to 'conventional banking'. This thesis will introduce a tool that assists in transparently, objectively and systematically assessing the environmental efforts of financial institutions, the results of which enables a straightforward and objective comparison. A better-informed society allows for its citizens to make decisions aligned with their values more easily.

1.4.3 Reporting Gap

In the Netherlands, 18 renowned financial institutions have collectively introduced a Sustainable Development Goals Investments (SDGI) agenda. Together, they have invited the Dutch government and the Dutch central bank (DNB) to actively support the SDGs. The SDGI signatories have elaborated their plan in a report called: Building Highways to SDG Investing. Stating that *''the private sector plays a critical role in safeguarding a sustainable future for upcoming generations''*, they are committed to making the SDGs a success in the Dutch financial sector, and thereby drive positive change (SDGI Agenda, 2016, p. 6).

The report, however, also acknowledges that in order to be successful a lot of work still needs to be done. Hence, a set of recommendations was prepared of which especially recommendations 3.2 *''Stimulate the uptake of sustainability standards in reports, benchmarks, and indices alongside national and international agencies – giving appropriate attention to both ESG and SDG indicators''* and 3.3 *''Clarify its SDG 'data' ambition and approach to measuring private sector contributions to the 2030 Agenda, to ensure efficient and value-added data capturing and reporting processes''* are of interest for this thesis project (SDGI Agenda, 2016, p. 11). The reporting gap mentioned by the SDGI Agenda will be further addressed in the course of this thesis.

1.5 Thesis Outline

Chapter two will address the methodology used throughout this thesis. Chapter three elaborates on the academic literature regarding the cross section of sustainability and the financial sector, including several assessment methods proposed by the literature. Chapter four will incorporate the findings of the literature review with the empirical evidence gathered through several expert interviews, in an attempt to construct the prototype system proposed in this thesis. Moreover, chapter four sets out to verify and validate the designed system, based on a real-world case application and an expert validation. Lastly, chapter five will conclude this thesis and addresses limitations of the current version of the tool, as well as recommendations for future development of the prototype system.

2. Methodology

This chapter offers a description of the research methods used throughout the thesis. The methodology shall describe the relevant methods according to the same order as the sub questions presented during the introduction. The order of sub questions is important, as information and conclusions derived from each sub question serve as input for the next sub question. Firstly, the rationale behind each sub question will be discussed, followed by the methodology chosen to obtain the insights necessary to answer the respective question.

(1) How can the financial sector contribute to sustainable development?

The objective of this thesis, earlier presented in the introduction, describes the necessity to consider the core business activities of financial institutions when assessing their environmental sustainability. There are many alternatives for a financial institution, however, when it comes to incorporating sustainable practices. The first sub question addresses (1) the numerous ways in which a financial institution can incorporate sustainable practices and (2) why sustainability matters most when incorporated inside core business activities. Only after this first sub question has been answered, it becomes apparent which activities of a financial institution should be assessed in order to measure a financial institution's indirect impact to environmental sustainability.

The role of sustainability in the financial sector has been thoroughly discussed in the literature. Hence, influential works will be selected and deliberated in order to start answering the first sub question. The search rationale behind this first part of the literature review can be observed in table 1. The first sub question will be answered through an extensive desk research, the results of which are carried over into sub question three.

(2) Which methods currently exist to measure the sustainable development performance of financial institutions?

Although the tool proposed in this thesis is unique, other attempts to measure (environmental) sustainability among financial institutions exist. The second sub question will consider examples of tools with similar ambition. Best practices will be carried over into sub question three. Moreover, it is important to not invent the wheel all over again in this thesis, but rather build further upon existing tools when relevant and appropriate.

Academic literature contains ample material on methods designed to gauge environmental and/or sustainable development performance of financial institutions. Influential articles will again be selected and dissected in an attempt to identify these comparable tools. Additionally, interviewees will also be asked (during the same interviews) to elaborate on the methods used

at their respective financial institutions when it comes to assessing their own (environmental) sustainability conduct. An overview of search engines, indices, results and snowballing results can be found in table 1, in order of occurrence in the literature review.

Table 1 - Literature search strategy

Search Engine	Search Indices	Results (reference)	Snowball	Results (reference)
Google	Sustainable Development Goals	United Nations, 2015	-	-
	SDG Indicators	UN Statistical Commission, 2016	-	-
Google Scholar	Sustainable Development Goals	Gupta & Vegelin, 2016	-	-
		Burford et al., 2013	-	-
Scopus	Sustainable Development Goals Review	Persson et al., 2016	-	-
		Chasek et al., 2016	-	-
Google Scholar	Sustainable Banking	Weber & Feltmate, 2016	Yes	Elkington, 1997
				Weber, Feltmate & Scholz, 2008
				Schueth, 2003
				Thompson & Cowton, 2004
				Wright & Rwabizambuga, 2006
				Sandberg et al., 2009
				Social Investment Forum, 2003
Google Scholar	Corporate Social Responsibility AND Financial Performance	Whetten, Rands & Godfrey, 2002	Yes	Wren, 1979
		Davis, 1960	-	-
		Bondy, Matten & Moon, 2008	-	-
Scopus	[Environmental OR Social] AND Financial Performance	Pava & Krausz, 1996	-	-
		Preston & O'Bannon, 1997	-	-
		McQuire et al., 1988	-	-
	Risk Mitigation AND Financial Performance	Hempel, Coleman & Simonson, 1990		
Google	Equator Principles	The Equator Principles, 2013	Yes	International Finance Corporation, 2012
Scopus	Social Responsible Investment	Renneborg et al, 2008	-	-
		Sparks & Cowton, 2004	-	-
Google	European SRI Studies	Eurosif, 2014	-	-
Scopus	Impact Investing	Hochstadter & Scheck, 2014	Yes	Erickson, 2011
				Conway, 2012
				Leonard, 2012
				Harji & Jackson, 2012
				Dacin, Dacin & Tracey, 2011
		Liebman, 2011	-	-
	Microfinance	Serrano-Cinca et al., 2015	Yes	Gutierrez-Nieto et al., 2009
Google	Greenhouse gas Protocol	GHG Protocol, 2011	-	-
	Impact Reporting and Investment Standards	IRIS, 2009	-	-
	Global Reporting Initiative	GRI, 2011	-	-
Scopus	Global Reporting Initiative	Milne & Gray, 2013	Yes	Hawken & Wackernagel, 2000
				Wackernagel, 2002
				Levy, Brown & de Jong, 2010
				Bennet & van der Lugt, 2004

(3) What are the requirements and specifications of an assessment tool based on the UN's SDGs, capable of assessing environmental sustainability for financial institutions' core business activities?

After having sifted through the literature relevant for answering sub questions one and two, answering sub question three will continue to generate input for the tool development by determining the requirements and specifications of the proposed tool. This marks the beginning of the tool design, which is concluded by the end of sub question four. Besides reviewing the literature, the interview reports too will serve as input in making the requirements and specifications more concrete.

Sub questions three, four and five correspond to the three phases of the systems design process used in this thesis. The three phases are (1) System Definition, (2) System Design and Development and (3) Verification and Validation. The steps and phases for the design of this tool are inspired on the work of Armstrong and Sage (2000). A graphical representation of this approach, adopted from their framework and used for this thesis, is presented in figure 1. Systems design was chosen as the leading methodology in this thesis for its capability to systemically incorporate user requirements and needs into a system, or tool, able to objectively and transparently produce an output given certain prespecified criteria, formulas and inputs.

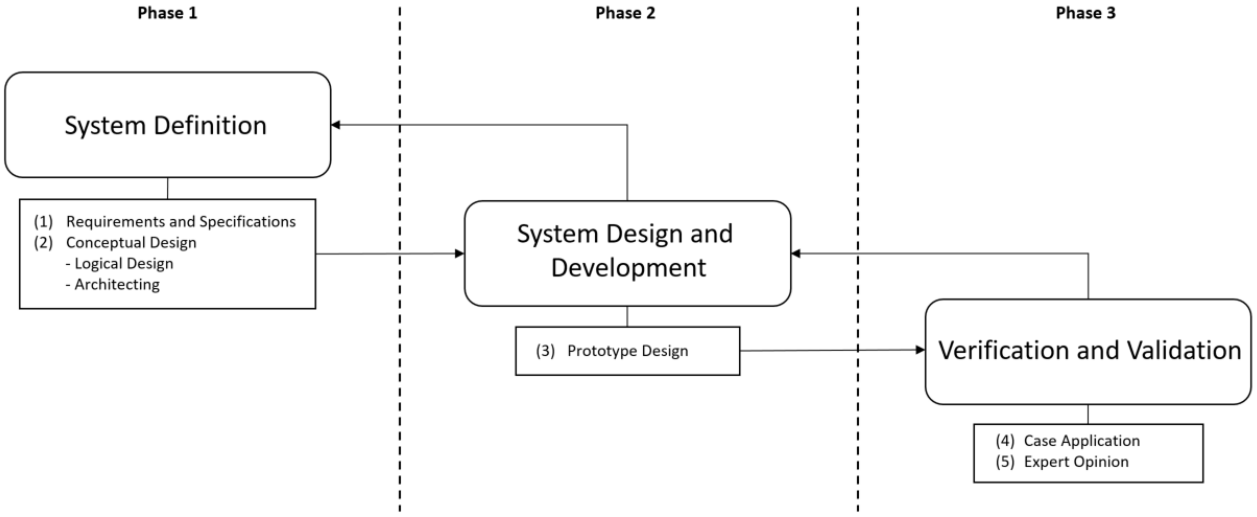

Figure 1 - Systems design method adopted from Sage and Armstrong (2000)

Sage and Armstrong describe the first step of the system definition phase as follows: "The requirements and specification phase of this systems engineering life cycle has as its goal the identification of client or stakeholder needs, activities, and objectives for the functionally operational system." (2000, pp. 59-60). Adopted to the scope of this thesis, the focus has been on identifying the needs and objectives of the tool according to potential users (e.g. banks, asset managers or pension funds). This process was done through an extensive literature review (sub questions one and two) and unstructured interviews with nine qualified respondents.

Interviews

A total of nine respondents were questioned during the interview phase of this thesis. Respondents qualify for an interview if they are professionals working in -or close to- the financial sector, who deal with the topic of sustainability on a daily basis. For a balanced set of respondents, interviewees were chosen from both for-profit and not-for-profit sectors, as well as both private sector and public sector. Table 2 shows an overview of the respondents and their respective company/organization, function, date of interview, duration and sector. One respondent wishes to remain anonymous both by name and company.

Table 2 - List of interviewees

Name	Company/ Organization	Job Description	Date of Interview	Duration	Sector
Rosl Veltmeijer	Triodos	Head of Sustainability Research	20-4-2017	1 hour	Private / For-Profit
Gert-Jan Sikking	PGGM	Senior Advisor Responsible Investment	25-4-2017	1 hour	Private / Not-for-Profit
Giulia Porino	Finance Watch	Membership Coordination and Development at Finance Watch	26-4-2017	38 minutes	Private / Not-for-Profit
Willem van Golstein Brouwers	Sustainalytics	Senior Advisor at Sustainalytics	26-4-2017	1 hour 5 minutes	Private / For-Profit
Francis Condon	RobecoSAM	Senior Sustainability Investing Analyst	1-5-2017	55 minutes	Private / For-Profit
Sitara Merchant	Aga Khan Agency for Microfinance	Research and Product Development Director	2-5-2017	30 minutes	Private / Not-for-Profit
Piet Sprengers	ASN Bank	Head of Sustainability Policy & Research	2-5-2017	1 hour	Private / For-Profit
Martin Rohner	Alternative Banks Schweiz	CEO	4-5-2017	30 minutes	Private / For-Profit
Anonymous	Anonymous	Civil Society Officer	12-5-2017	55 minutes	Public / Not-for-Profit

Given the different areas of expertise of the interviewees, an unstructured interview approach was chosen. A set of questions (interview protocol) was designed ahead of the interviews (Appendix II). However, depending on the expertise of the interviewee and the course of the interview itself, as well as the time available per interview, the actual questions were adjusted per interview. All interviews, except for the anonymous public sector civil society officer, were recorded. Reports of these interviews can be found in Appendix III. Five interviews were conducted in a face-to-face setting, three interviews were conducted via Skype video and one interview was conducted over the phone. Given the theoretical nature of the interviews, no significant difference in interactions was observed between face-to-face, Skype or the phone interviews.

The interview protocol was designed to address four main areas that are of interest for this thesis. The first topic consists of a general introduction, aimed to gain a better understanding of the respondent and the company/organization he or she works for. The second topic aims at gaining a better understanding of the interviewee's perception of the importance of sustainability in the financial sector as a whole. The third topic addresses in-depth the

sustainability assessment methodologies currently used at the interviewee's company/organization, as well as the method's virtues and shortcomings. Lastly, topic four was designed to gain an insight in the role of the SDGs at the companies/organizations of the interviewees, both currently as well as their predictions for the (nearby) future. Furthermore, this topic was designed to obtain information regarding positive characteristics of a sustainability assessment methodology.

The general introduction of the protocol (topic 1) is mostly relevant for those readers of this thesis interested in understanding the background of the interviewees. Topic 2 – Sustainability in the Financial Sector – was chosen to validate and add to the literature review critical to this thesis (sub question one). Topics 3 and 4 were specifically designed to gain a deeper understanding of sustainability assessment tools in general (sub question 2) and the requirements and specifications of a tool designed to assess environmental sustainability of financial institution's indirect impact using the SDGs as leading criteria (sub question 3).

The reports based on the interviews are used throughout this thesis as empirical, practitioner evidence. Given the unstructured nature of the interviews, no quantitative analyses were performed based on the interview results; the analysis is of a qualitative nature. Regardless of the fact that several arguments are recurrent among more than one respondent, each argument was weighted equally important in light of determining the requirements and specifications of the assessment tool proposed in this thesis. The interview reports have been sent back to respondents if requested and thus were given the opportunity to review their answers.

(4) What can a working prototype of the assessment tool proposed in this thesis look like?

Sub question four corresponds to the second phase of the tool design: System Design and Development. Before creating a working prototype, or conceptual design, of the proposed tool, it is important to first make decisions on higher-level architectural specifications. The high-level architectural specifications have been drawn in Excel as flowcharts, thereby graphically representing the entire process; the flowcharts serve as the blueprints for the tool prototype. Furthermore, the decision choices are wholly based upon the outcomes of sub question three.

The second part of sub question four will concern itself with the actual design of the proposed tool. The tool will be completely designed according to the structure devised in the first part of this sub question. The tool operates in an Excel environment to ensure accessibility of the tool to third parties. Therefore, step three 'Prototype Design' has been programmed in Visual Basic for Application, a programming language developed by Microsoft and supported by Excel.

(5) To what extent is the proposed environmental sustainability assessment tool based on the SDGs usable and valid?

Finally, it is important for the designed tool to be tested using a real-world case, in order to discover recommendations for future improvements of the tool. Additionally, it is useful if experts review the case application of the tool and give their opinions on the outcome of the assessment. These two activities refer to the verification and validation of the proposed tool respectively. Therefore, the fifth sub question has been divided into two steps: (1) Case Application and (2) Expert Opinion (as in accordance with steps four and five of figure 1).

Case Application

In order to test the tool, a real-world case has been assessed in an effort to determine the usability of the system. The goal of the case application was not to form a normative judgement regarding the environmental sustainability of the case applied to the tool, but rather to encounter any operational malfunctions or potential design improvements. The usability of the tool is verified if the outcome of the tool is according to expectations, considering the design requirements and specifications that were addressed in earlier sub questions. Since the outcome of the assessment itself is not relevant for the verification phase, a case was selected based solely on the availability and transparency of the required data inputs.

Expert Opinion

The results of the case studies were examined by two experts with a long track record in the field of assessing financial institutions. An unstructured interview has been conducted with both experts in order to document the findings. The interview reports can be found in Appendix IX. Ultimately, the opinions of the experts have been guiding for the conclusions, as well as the recommendations on the further development of the tool.

3. Literature Review

This chapter will provide an overview of the literature in order to answer the first two sub questions. The literature review will begin by addressing the UN's SDGs, as well as expressed criticism on the SDGs. Since the SDGs forms the basis of the prototype tool proposed in this thesis, it is essential to understand the SDGs well, in order to see which goals are appropriate to be used in the system, and to identify how they might be used. Section 3.1 will shed light on the SDGs, section 3.2 will focus on the role of the financial sector in matters of sustainability and section 3.3 will elaborate upon methods currently in use to assess sustainable practices of financial institutions.

3.1 The Sustainable Development Goals

In an attempt to create a successor to the Millennium Development Goals (MDGs), the United Nations adopted the Sustainable Development goals on the 25th of September, 2015 (United Nations, 2015). The SDGs, which share certain elements of the MDGs, are made up of 17 goals (figure 2), 169 targets and 230 indicators designed to measure the impact on sustainable development. The 230 indicators were agreed upon in March 2016, and are pivotal to the process of measuring and assessing the success of the SDGs (UN Statistical Commission, 2016). The United Nations are calling on virtually everybody, governments, private sector, civic society and individual citizens alike to contribute to the implementation of SDGs wherever suitable.

Together, the seventeen sustainable development goals of the UN stipulate a roadmap towards an inclusive global society without poverty, while simultaneously protecting planet Earth from irreversible depletion of its natural capital (United Nations, 2015). Appendix I provides a detailed description of all seventeen SDGs.

Figure 2 - List of Sustainable Development Goals (United Nations, 2015)

3.1.1 Critique on the Sustainable Development Goals

Although the SDGs have only been adopted recently and little can be said so far with regard to its effect and success, recommendations and criticism on the SDGs can be found in abundance in the academic literature. This section clusters the most common critiques.

Conceptual Criticism

Underlying the SDGs are several pillars which are pivotal in shaping the concept of sustainable development. In earlier days, sustainable development referred mostly to the environmental pillar (Redclift, 2005). In the SDGs, however, there is also an economical pillar addressed, considering that every nation has the right to pursue economic growth, and a social pillar, considering that economic growth cannot be sustainable unless in the form of inclusive growth.

Gupta and Vegelin (2016) stress that it is important for the SDGs to equally address these three pillars. However, after assessing the 17 SDGs and their respective targets in light of these pillars, Gupta and Vegelin found that overriding priority is given in the SDGs to social inclusiveness, focusing less on ecological and relational inclusiveness (i.e. sustaining long-term growth, rather than short-term social inclusiveness). They argue that without giving equal priority to social and relational inclusiveness, long term social inclusion cannot be sustained.

Burford et al. (2013) argue that a fourth pillar is missing, relating to human values, ethics and worldviews. This fourth pillar is inherently difficult to assess, as its complexity is largely reflected by value-based indicators, rather than quantifiable and easily measurable indicators.

International versus National

Persson et al. (2016) state that albeit governments at the national level play an important role in the implementation of the SDGs, little arrangements were addressed regarding domestic implementation during the negotiation phase.

Chasek et al. (2016) conclude, similar to Persson et al. (2016), that a mismatch exists in global, national, regional and sub-regional indicators. Looking forward, the authors argue that it is pivotal to incorporate the needs of different actors on different levels in the (implementation) mechanisms of the SDGs.

Review Mechanism

Critically important for the successful implementation of SDGs on the domestic level is a functioning *follow-up* and *review* system. Although both topics are addressed in a Secretary General report of early 2016 (UN, 2016), little has been said about what exactly needs to be reviewed/followed-up upon. Therefore, Persson et al. (2016) conclude that the global effort to create these systems not necessarily translates into successful and domestically implementable systems. Additionally, they recommend that emphasize is put on reporting action undertaken to achieve the SDGs, rather than predominantly focus on indicator-based reporting.

3.2 Sustainable Finance

The SDGs are designed to address sustainable development in an overarching manner. This means that when all 17 SDGs are achieved, the UN's goal of realizing "*human rights of all and to achieve gender equality and the empowerment of all women and girls''* as well as "*to protect the planet from degradation, including through sustainable consumption and production*" is accomplished (United Nations, 2015, pp. 1 - 2). As was discussed in the previous section, it is necessary to divide this grand task in manageable portions, which has led to the introduction of 169 targets and 230 indicators. Even though the UN calls upon every actor and every sector of the economy to contribute to their global agenda, clearly not every actor and sector can contribute equally to this agenda. Instead, it would be more useful for the actors and sectors to focus on those SDGs where their efforts will be most efficiently translated into results. Therefore, it is important in light of this thesis to ask the following question:

''How can the financial sector contribute to sustainable development?''

First of all, it is important to distinguish two distinctively different ways in which a financial institution is able to impact the UN's targets of sustainable development. Firstly, financial institutions themselves employ millions of people worldwide; in the United States alone around 8 million found employment in the financial (services) sector in 2014 (BLS, 2015). This effectively means that financial institutions worldwide can directly contribute to SDGs. For instance, by addressing equality issues (e.g. SDG 5, *gender equality*, by promoting equal opportunities for men and women), operational sustainability issues (e.g. SDG 7, *renewable energy*, by investing in CO_2-neutral offices through the installation of solar panels) or employment security issues (e.g. SDG 8, *good jobs*, by investing in fixed contracts rather than hiring flexible labor).

Secondly, financial institutions can indirectly impact sustainable development through the financial liquidity they provide when investing in -or lending money to- a client. Globally, financial institutions control trillions of US dollars, which are purposefully put to work in those areas where the money can most efficiently be used to generate financial returns. When the loans or investments are used by a client to create products or services, the financial institution providing the liquidity has indirectly impacted the world, for better or worse.

This does not imply that one of the financial institutions' core activities, providing liquidity, inherently contradicts sustainable development. On the contrary, financial institutions such as the members of the Global Alliance for Banking on Values (GABV) acknowledge the ecological cost of pollution and the social cost of injustice and have adjusted their business principles accordingly. In doing so, these financial institutions can effectively contribute to SDGs through their lending and investment portfolios. For instance, by addressing economic inequality issues (e.g. SDG 1, *no poverty,* or SDG 10, *reduced* inequalities, by investing in -and lending money to- small entrepreneurs in developing countries), or overfishing issues (e.g. SDG 14, *life below water*, by only providing financial services to responsible fisheries).

Considering that the financial sector plays a major role in virtually any other sector of the economy, its ability to indirectly impact sustainable development is immense. For this reason and in consideration of the limited scope of this thesis, only the indirect impact of financial institutions on sustainable development shall be considered throughout this thesis. Figure 3 is a graphical representation of the distinction between direct and indirect ways in which financial institutions can have an impact in terms of CO_2 emissions.

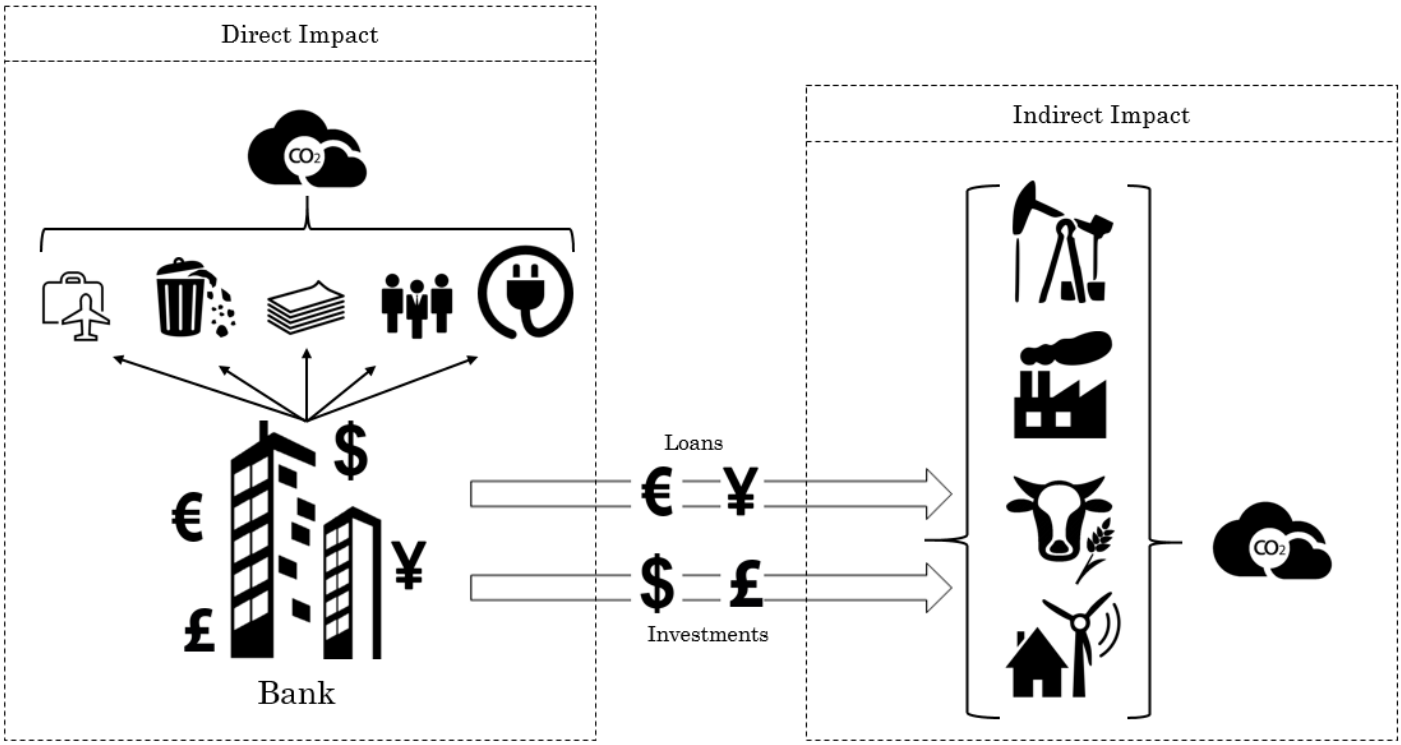

Figure 3 - A bank's indirect versus direct impact on CO_2 emissions

3.2.1 The Gradations of Financial Sustainability

The introduction already provided a glance into the several gradations that can be distinguished when considering different manners by which financial institutions can contribute to sustainable development. This part of the literature review will deep-dive into the different types of sustainable conduct in finance. In line with figure 4, the sustainability in finance spectrum, the different types of sustainable conduct will be addressed throughout this chapter in similar order; moving from the business case for sustainability towards the sustainability case for business. The sustainability in finance spectrum is inspired on the work of Weber and Feltmate (2016).

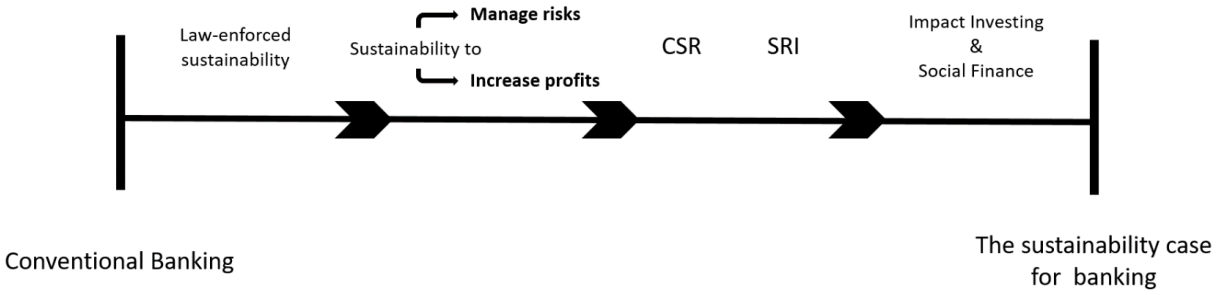

Figure 4 - Sustainability in finance spectrum

3.2.1.1 The Business Case for Sustainability

One reason for financial institutions to incorporate sustainable practices to a certain extent, is simply because sustainability is thought to pay off in some cases (Burke & Logsdon, 1996; Margolis & Walsh, 2003). This also means that if not for a positive influence on the financial bottom line, sustainability practices would quickly be forgotten in a conventional financial institution. Consequentially, a conventional financial institution's sustainability practices marketed as an instrument to drive positive impact, de facto is merely another instrument to create monetary value. Hence, the concept of a triple bottom line, originally coined by Elkington (1997) meaning that equal priority is given to environmental, social and economic sustainability, is more realistically illustrated in the case of a conventional financial institution as a single bottom line either positively influenced through environmental and social sustainability practices, or not influenced at all.

Weber and Feltmate (2016) argue that when it comes to creating monetary value, twelve sustainability drivers can be identified across all sectors. Five out of twelve sustainability drivers are highly or highly to moderately important for the financial sector. First of all, incorporating sustainability practices as a financial institution could increase profitability as it contributes to (1) higher customer attraction and (2) higher employee satisfaction. Especially since the 2008 financial crisis, customers have increasingly become aware of sustainability concerns in the financial sector. Hence, adopting sustainable practices is an effective way to attract more customers, thereby ultimately increasing shareholder value. Additionally, it has been shown that employees of companies that embrace sustainable practices are more likely to be satisfied, are more productive and more likely to stay on for a longer period (Davis, 1960; Whetten et al., 2002; Wren, 1979; Salzmann et al., 2005).

Secondly, sustainability drivers which are less important but can still significantly impact a financial institution's bottom line are (3) reporting requirements, (4) operational efficiency and (5) addressing media/activist pressure. Reporting requirements are increasingly becoming more stringent, hence adopting sustainable practices can prevent costly regulatory hassle. Operational efficiency refers to the direct impact of a financial institution, as previously discussed in this chapter. Increasing material and labor efficiency ultimately reduces costs per unit of production, therefore increasing profitability. Lastly, media and activist groups can greatly impact a financial institution's reputation. Managing this reputation risk through the incorporation of sustainable practices can prevent costly scandals (Weber & Feltmate, 2016).

Weber and Feltmate proceed to back up this theory by comparing an index of SRI Funds to the Morgan Stanley Capital Index (MSCI), resulting in the conclusion that sustainable funds outperform their conventional counterparts on share price performance (Weber & Feltmate, 2016).

Economically pragmatic arguments for sustainable practices go back over half a century, then referred to as corporate social responsibility (CSR). Employee satisfaction, reporting requirements and media/activist pressure, as mentioned by Weber and Feltmate, have been addressed previously as sustainability drivers benefitting from CSR, designed to ultimately create monetary value for a company (Davis, 1960; Wren, 1979; Whetten et al., 2002). Ample empirical studies have been conducted, albeit not specifically for the financial sector, stressing the positive relation between a company's environmental and social performance (ESP) and its financial performance (Pava & Krausz, 1996; Preston & O'Bannon, 1997; McQuire et al., 1988).

In conclusion, adopting sustainable practices within a company, for example through the creation of a CSR department, has been frequently linked to monetary value creation for that same company. Hence, an argument can be made in favor of the business case for sustainability. It is also clear, however, that the presence of a CSR department de facto means that a company is not committed to sustainability practices on the level of core values, as that would render a separate department unnecessary. Therefore, adopting sustainability merely in view of monetary value creation marks the first stage in the sustainability in finance spectrum.

3.2.1.2 Risk Mitigation through Sustainable Finance

Mitigating risk through sustainable financial conduct shows similarities in terms of reasoning to the business case for sustainability. The rhetoric behind the sustainability drivers mentioned in the previous chapter as discussed by Weber and Feltmate (2016) could by turned around, i.e. accepting the business case for sustainability means that it is a risk not to adopt sustainable practices within a financial institution from a financial performance perspective. Moreover, being able to successfully incorporate the cost of risk in the price of a financial product/service makes a financial institute more profitable (Hempel, Coleman, & Simonson, 1990). However, when social and environmental risk assessments become part of the standard risk assessment (i.e. not just for profitable gains), clearly this means progress from the perspective of sustainable development.

This development within the financial sector is embodied by the 208 signatories of the UNEP FI's statement, declaring that economic development incompatible with human welfare and a healthy environment is ultimately a financial risk (UNEP FI, 2017).[2] According to Weber, Fenchel and Scholz (2008), "UNEP banks take environmental risks into consideration more often in rating, costing, pricing and monitoring than non-UNEP banks" (Weber, Fenchel, & Scholz, 2008, p. 157). However, according to Thompson and Cowton (2004) "signatories' practices do not always match up to the aspirations contained in the UNEP Statement" (Thompson & Cowton, 2004, p. 203). Hence, considering that compliance with the UNEP FI's statement is not regulatorily enforced, signatories commonly sign based only on the premise that sustainable conduct through environmental and social risk assessments enhances financial performance.

Another, yet different, attempt to systemically incorporate sustainable practices within the financial sector are the Equator Principles (EP), which were first launched in 2003. Similar since EP members are united through values closely related to UNEP FI's statement, yet different since the EP is a form of industrial self-regulations (as opposed to public regulation) with private (and voluntary) codes of conduct guiding business behavior in the financial sector. Through its 89 signatories based in 37 countries, the financial institutions affiliated with the EP cover more than 70% of all project finance (The Equator Principles, 2013). It can be argued that the EP form a positive development for global project finance in light of sustainability, as it encourages large players in the financial sector to systemically live up to the International Finance Corporation's (IFC) standards, upon which the EP are based.

Complying with the IFC's standards means that EP signatories must (1) perform environmental and social risks and impacts assessments, (2) address labor and working conditions, (3) improve resource efficiency and pollution prevention, (4) consider community health, safety and security, (5) address land acquisition and involuntary resettlement issues, (6) promote biodiversity conservation and sustainable management of living natural resources, (7) consider indigenous people and (8) protect cultural heritage (IFC, 2012).

Nevertheless, signing the EP remains a voluntary commitment as well. Wright and Rwabizambuga (2006) argue that "financial institutions adopted the Equator Principles to help shield them from reputational damages" (Wrigth & Rwabizambuga, 2006, p. 107). The notion that adopting codes of conduct stems from an extrinsic motivation (i.e. a financial institution adopts the EP to control its stakeholders and manage its reputation towards clients), rather than intrinsic motivation (i.e. a financial institution adopts the EP out of genuine desire to be more environmentally, socially and economically sustainable), is supported by Bondy et al. (2008) who state that "codes, once adopted and implemented, are hardly more than just another tool by which the organization is managed more efficiently and by which internal stakeholders are committed" (Bondy, Matten, & Moon, 2008, p. 303).

In conclusion, considering that sector-wide regulation, in the form of public or self-regulation, systemically encourages financial institution to address issues of environmental, social and economic sustainability, it deserves to be mentioned separately from the business case for

[2] UNEP FI stands for United Nations Environment Programme Finance Initiative.

sustainability in the sustainability in finance spectrum. However, the often extrinsically motivated signatories could shy away from compliance with impunity due to the voluntary nature of regulations such as UNEP FI's statement or the EP. Therefore, financial institutions incorporating sustainable practices in their business behavior only to the extent of voluntary codes trail behind other forms of financial sustainability practices, which will be addressed hereafter.

3.2.1.3 Socially Responsible Investment

While acknowledging that forms of religion-based SRI date back hundreds of years, Schueth (2003) traces modern SRI back to the 1960s in the United States, where cold war and women rights concerns "served to escalate sensitivity to issues of social responsibility and accountability" (Schueth, 2003, p. 190). Schueth continues to distinguish three strategies of SRI, (1) screening, (2) shareholder advocacy and (3) community investing. Screening in the context of SRI means that companies are included or excluded from an investment portfolio over ethical, environmental or social concerns. Stakeholder advocacy refers to the action taken as (part) owner of a company, for example through engaging in dialogue or submitting -and voting on- proxy solutions. Lastly, community investing is the action of providing capital "to people in low-income, at-risk communities who have difficulty accessing it [capital] through conventional channels" (Schueth, 2003).

Sandberg et al. (2009) stress the diversity of SRI strategies, phrasing it as the heterogeneity of socially responsible investment. They distinguish four types of SRI heterogeneity, (1) terminological, (2) definitional, (3) strategic and (4) practical. Of particular interest is strategic heterogeneity, which they continue to describe as "the issue of just how non-financial concerns should be integrated in the investment process or, more exactly, what investment strategies SRI encompasses" (Sandberg et al, 2009, p. 521). Several SRI strategies are acknowledged, yet according to the Social Investment Forum (SIF), individual strategies are not applied equally frequent throughout SRI portfolios (SIF, 2003).

The European Sustainable Investment Forum (Eurosif), who claim that currently 30% of all investment are managed under SRI principles, add to the strategic heterogeneity referred to by Sandberg et al. by listing seven SRI strategies (Eurosif, 2016). According to Eurosif, following any of these strategies would classify an investment as responsible (table 3). Although the list presented by Eurosif is the most exhaustive (in number of strategies), similar lists including comparable strategies have been presented by the Global and Sustainable Investment Alliance (GSIA), UN Principles for Responsible Investment (PRI) and the European Fund and Asset Management Association (EFAMA) (GSIA, 2016; PRI, 2006; EFAMA, 2014).

Having established that SRI is a general and broad concept, attempts to provide leaner definitions can be found in the literature as well. Sandberg et al. (2009) define socially responsible investment as investments that can be understood as "financial initiatives which seek to integrate ethical, social, environmental and/or corporate governance concerns in the investment process" (Sandberg et al, 2009, p. 531). Renneborg et al. (2008) define SRI as "an investment process that integrates social, environmental, and ethical considerations into

investment decision making" (Renneborg, Ter Horst, & Zhang, 2008, p. 1723). Sparks and Cowton (2004) use the term SRI as "the exercise of ethical and social criteria in the selection and management of investment portfolios, generally consisting of company shares (stocks)" (Sparks & Cowton, 2004, p. 47).

Thus, it becomes clear that SRI distinguishes itself from previously mentioned forms of sustainable finance as concerns for ethical, social, environmental and corporate governance criteria are considered in the investment selection process. SRI differs from 'risk mitigation through sustainable finance' as both sustainability and financial concerns are weighed equally. However, related to the aforementioned strategic heterogeneity, SRI strategies themselves can vary greatly in terms of sustainability integration as well. This becomes evident when one compares, for example, the strategies 'exclusion' and 'norms-based screening' (table 3). The prior means that potential investments dealing with certain *excludable* activities such as weaponry, nuclear and/or fossil energy or child labor will not be included in an investment portfolio. Norms-based screening, on the other hand, specifically aims to find investment opportunities that will support durable solutions upholding ethical and environmental, social and corporate governance (ESG) criteria, for instance investment opportunities in affordable housing, clean energy technology, sustainable farming etc.

For these reasons, SRI finds itself ahead of 'the business case for sustainability' and 'risk mitigation through sustainable finance' in the sustainability in finance spectrum, yet behind other forms of sustainable finance, such as impact and social finance.

Table 3 - Seven SRI Strategies as mentioned by Eurosif (Eurosif, 2014)

SRI Strategy	Description
Best-in-Class	*"... involves the selection ... of the best performing or most improved companies or assets as identified by ESG analysis ..."*
Engagement and Voting	*"Active share ownership through voting or proxy voting is the primary means by which shareholders can influence issuers' ESG strategies and practices."*
ESG Integration	Analysis based on environmental, social and governance principles
Exclusion	*"... systematically excludes companies, sectors or countries from the permissible investment universe if involved in certain activities based on specific criteria."*
Impact Investing	*"... provides capital to support solutions to the world's most pressing challenges in sectors such as sustainable agriculture, affordable housing, affordable and access to healthcare, clean technology and financial services."*
Norms-Based Screening	*"... involves the screening of investments based on international norms or combinations of norms covering ESG factors."*
Sustainability Themed	"… contribute to addressing social and/or environmental challenges such as climate change or national resource depletion."

3.2.1.4 Impact and Social Finance

Moving up on the gradations of financial sustainability, the final halt is impact and social finance. Similar to *Impact Investing*, one of seven SRI strategies mentioned by Eurosif, impact and social finance move beyond financial KPIs as the final step of an investment decision. Impact and social finance can be characterized as forms of finance serving merely as a means to a purpose, namely addressing ethical, environmental and social issues around the globe. In contrary to SRI, sustainability criteria are no longer a precondition for investing or lending money, instead, such criteria have become the financial institution's *raison d'être*.

The Global Alliance for banking on Values (GABV) is a network for "banks using finance to deliver sustainable economic, social and environmental development" (GABV, 2017). Commonly referred to as values-based banking, the GABV lists six principles a financial institution should be founded upon in order to comply with impact and social finance standards (GABV, 2017):

1. Triple bottom line approach at the heart of the business model;
2. Grounded in communities, serving the real economy and enabling new business models to meet the needs of both;
3. Long-term relationships with clients and a direct understanding of their economic activities and the risks involved;
4. Long-term, self-sustaining, and resilient to outside disruptions;
5. Transparent and inclusive governance;
6. All of these principles embedded in the culture of the bank

Like SRI, impact and social finance is not without any problems of its own. Impact and social finance suffers from a "lack of definitional, conceptual and terminological clarity" (Hochstadter & Scheck, 2014, p. 451). This can be harmful because (1) an ambiguous definition forms a threat to the credibility of impact investing, (2) a lack of clarity may hinder market growth and broader adoption and (3) clear scientific debate is inhibited by a lack of clarity (Erickson, 2011; Conway et al., 2012; Leonard, 2012). Höchstädter and Scheck (2014) conclude that the novelty of the impact and social finance field makes for scarce academic literature on the topic. Part of this heterogeneity can be explained by the several different forms of impact and social finance, which will now be discussed.

A common activity among values-based financial institutions is impact investing. The notion *impact investing* finds its origin in a discussion hosted by the Rockefeller Foundation involving leaders of finance, philanthropy and development in Rome (Harji & Jackson, 2012). Impact investing, in contrary to philanthropy, aims to receive a financial return, yet in contrary to conventional finance, positively impacting social and environmental criteria is an objective on its own (Louche, Arenas, & van Cranenburgh, 2012). Impact investing is growing, a growth according to Dacin et al. (2011) attributable to ''a broader movement gaining momentum in contemporary market economies, one demanding a more ethical and socially inclusive capitalism'' (Dacin, Dacin, & Tracey, 2011, p. 1204).

Another form of impact finance is the so-called social impact bond (SIB). An SIB is a fund-raising instrument, designed to finance social projects. When (social and/or environmental) KPI targets are met for a certain project, investors are paid back the principal plus a financial return.

Commonly, SIBs are used by governments to fund projects that otherwise would have been funded with tax payer's money. The principal plus interest is paid back through government cost savings and tax-income generated through the alternative allocation of government resources (Liebman, 2011). The novelty of SIBs and its social dimension, for which outcomes are difficult to assess, make it hard to adequately price SIBs. SIBs therefore remain only a small sub-category of impact and social finance (Schinckus, 2015).

A third form of impact and social finance is microfinance. According to Serrano-Cinca et al. (2015), microfinance institutions (MFIs) "provide micro credits – small loans not backed by collateral – to low-income individuals with poor or non-verifiable credit history" (Serrano-Cinca, Gutierrez-Nieto, & Reyes, 2015, p. 3504). Although the social dimension of MFIs clearly sets them apart from conventional banking institutions, they share similar core activities; loans are granted to debtors, deposits are collected from creditors and, when necessary, debts are collected with interest (Gutierrez-Nieto, Serrano-Cinca, & Mar-Molinero, 2009).

Together, these forms of social and impact finance form the final stop of the sustainability in finance spectrum. When financial returns are no longer the main reason for a financial institution to invest in or lend money to an individual/company/organization, it can be attributed the sustainability case for business.

3.3 Measuring Sustainable Development through Finance

Previously in this chapter, the concept of sustainable development and the role of the financial sector within this concept were touched upon. It has been discussed that through financing sustainable development, the financial sector is able to positively impact the status quo. In this prescribed scenario, a change will occur over time in regard to the extent to which development occurs sustainably, as a result of actions undertaken in the financial sector. Without measuring this change, however, any conclusions with regard to the actual impact remain meaningless. Therefore, this chapter will focus on this issue by addressing the following question:

''Which methods currently exist to measure the sustainable development performance of financial institutions?''

An overview of methods will be given in this chapter; after all, to measure is to know. Again, it is important to stress the distinction between the direct and indirect impact a financial institution may have on sustainable development. Whereas it is relatively straightforward to measure the direct impact of a financial institution (e.g. annual electricity consumption of all offices, number of kilometers employees commute annually or the kilograms of paper used in a year), measuring the indirect impact of financial institutions on sustainable development criteria through their investment and lending portfolios is far less straightforward. This section covers a handful of such assessment methods.

3.3.1 Using LCA to measure FI indirect impact

Weber and Feltmate (2016) present in their book *Sustainable Banking* three steps to calculate the "indirect environmental impacts of finance" (Weber & Feltmate, 2016, p. 90). This indirect impact assessment methodology considers the impact of individual investees, multiplied by the percentage of capital provided by the financier. When the entire portfolio is assessed in this manner, an overview of the total indirect impact of the financial institution can be devised. The three steps leading up to this result are as follows:

(1) The *financier's capital ratio* is determined. This ratio can be calculated by dividing the capital provided by the financial institution by the total capital which is being employed by an investee.

(2) The second step concerns itself with the environmental impact assessment which, as suggested by Weber and Feltmate, is carried out through a Life Cycle Assessment (LCA)[3]. Using the CO_2 emissions database for LCA's, the carbon intensity of the product/service invested in can be determined. When multiplied by the total amount of products/services, the total impact of the investee can be calculated.

(3) Combining steps one and two, it is now possible to calculate the environmental impact the financial institution has through a specific capital commitment. This number is acquired through multiplying the financier's capital ratio of step one, with the total impact obtained in step two.

Applying these steps throughout the breadth of a financial institution's investment and lending portfolio and summing each of the indirect impacts (in a common denominator such as CO_2 equivalent) provides the total indirect environmental impact of the financial institution.

Greenhouse Gas (GHG) Protocol

The GHG Protocol aims to globally set a standard for when it comes to measuring, managing and reporting on greenhouse gas emissions. Although the GHG Protocol does not exclusively tend to the financial sector, category 15 of its *Corporate Value Chain Accounting and Reporting Standard* does specifically address the environmental impact of financial institutions through investments and other financial services (e.g. debt investment or project finance). The methodology behind this assessment corresponds to the theory described by Weber and Feltmate (2016), as "emissions from equity investments should be allocated to the investor based on the investor's proportional share of equity in the investee" (GHG Protocol, 2011). The proportional share of equity invested in the investee is then multiplied by the GHG equivalent allocated to that specific product/service, which is derived through a form product/service lifecycle assessment.

3.3.2 Impact Reporting and Investment Standards – IRIS (GIIN)

Launched in 2009, IRIS provides a common language in the world of impact investing and aims to become the global standard for reporting on impact investing. In addition to the definitions

[3] "LCA addresses the environmental aspects and potential environmental impacts (e.g. use of resources and the environmental consequences of releases) throughout a product's life cycle from raw material acquisition through production, use, end-of-life treatment, recycling and final disposal (i.e. cradle-to-grave)" (ISO, 2016)

and terminology that IRIS provides, it also created hundreds of metrics which can be used by both investors and investees to report on their environmental and social performance. Ranking and judging companies and funds based on their social and environmental performance is not within the scope of IRIS.

3.3.3 GRI

The Global Reporting Initiative (GRI) was founded in 1997 with the involvement of the United Nations Environment Programme (UNEP). Nowadays, GRI is a globally recognized brand providing standards on sustainability reporting. Its goal is to enable a ‘‘balanced and reasonable representation of the sustainability performance of the reporting organization, including both positive and negative contributions’’ (GRI, 2011, p. 43). The GRI standards support sustainability reporting across all sectors of the economy. Additionally, there are distinctions made through the inclusion of so-called *sector specific aspects*. For the financial sector, and of interest for this chapter, the GRI has also included sector specific aspects for financial institutions’ product portfolios (i.e. focusing on the indirect impact of financial institutions as in accordance with previously described working definition of direct and indirect impact), for example:

> The GRI prescribes financial institutions to report on (1) the ‘‘percentage of the portfolio for business lines (e.g. micro/SME/large) by specific region’’, or (2) the ‘‘monetary value of products and services designed to deliver a specific social benefit, for each business line broken down by purpose’’, or (3) the ‘‘monetary value of products and services designed to deliver a specific environmental benefit, for each business line broken down by purpose’’ (GRI, 2013, pp. 32-34).

It must be noted that the GRI does not provide any form of ranking or scoring the companies complying with the GRI reporting standards. The GRI reporting framework relies on completely voluntary compliance. This approach to sustainability has led to criticism. Milne and Gray (2013) state that the lax TBL approach of (among others) the GRI has ‘‘become dangerously confused with advancing a just and sustainable world’’ (Milne & Gray, 2013, p. 24). This problem stems from the GRI’s reluctance to provide any definition of sustainability or sustainable development (Hawken & Wackernagel, 2000; Wackernagel, 2002). Moreover, it has been suggested that in order for the GRI to reach a broad audience, the range of environmental and social indicators have remained incomplete, as member organizations were reluctant to address indicators of a too demanding nature (Levy, Brown, & de Jong, 2010; Bennet & van der Lugt, 2004)

3.3.4 GABV Scorecard

The Global Alliance for Banking on Values (GABV) is a network of 40 values-based banks and was established in 2009. Ever since, it has worked on creating metrics to measure and communicate the ways in which a financial institution can contribute to social empowerment, environmental regeneration and economic resiliency. In support of this mission, the GABV has created a scorecard capable of assessing banks on their alignment with GABV’s principles of values-based banking. Unlike for example the methods of the GRI and IRIS, the GABV aims to use their

scorecard methodology as the foundation for research comparing Globally Systemic Important Financial Institutions (GSIFI) with sustainable banks.

The GABV scorecard methodology assesses the indirect impact of financial institutions by focusing on three different dimensions: (1) Triple Bottom Line – non-Triple Bottom Line, (2) Financial Economy – Real Economy and (3) on-balance sheet – non-balance sheet.

(1) Financial instruments (investments, loans, etc.) are called TBL if they support individuals or enterprises delivering impact in at least one of three categories: a) social empowerment (e.g. education or special needs housing), b) environmental regeneration (e.g. renewable energy or sustainable agriculture) or c) economic resiliency (e.g. microfinance or MSME lending). A decision tree has been designed to determine whether or not a financial instrument qualifies as TBL. Conditions for TBL are that the financial instrument has a positive impact on at least one of the categories, without negatively impacting another category. If there is a positive impact on one category, but also a negative one, there should be sufficient mitigating factors in place.

(2) In order to determine whether a financial instrument classifies as being part of the financial economy or real economy, the GABV distinguishes five degrees of separation between real economy and financial economy. Financial instruments in the zeroth (a real asset) or first degree, belong to the real economy. Financial instruments belonging to the second, third of fourth degree classify as being part of the financial economy (Appendix X). Examples of the degrees of real/financial economy are a clothes manufacturer (zeroth degree), a direct loan to a clothes manufacturer (first degree), a purchase of shares of a clothes manufacturer in a secondary market (second degree), a credit default swap transferring the risk of a clothes manufacturer asset between two financial institutes (third degree) or a collateralized debt obligation of which a certain clothes manufacturer asset is part of (fourth degree).

(3) More straightforward is the distinction between on-balance sheet assets and non-balance sheets assets. On-balance sheet assets are actually owned by the financial institution, whereas non-balance sheet assets are commonly owned by a third party and are only managed by the financial institution. Examples for on-balance sheet assets are cash-at-hand (short-term liquid), investments and loans, whereas examples for non-balance sheet assets are funds managed for third parties and letters of credit.

After the three previously described dimensions have been assessed, the quantitative factors can be scored. The individual scores are then compared to market benchmarks, which allows for an algorithm to calculate the base assessment, producing a score from 0-100. Finally, qualitative elements (e.g. leadership commitment to sustainability and transparency) are used for a final calibration of the score, allowing for a maximum of 20 points to be added or subtracted from the base score. Ultimately, by using a score from 0-100, the GABV scorecard is thus capable of creating a ranked system, comparing the sustainability performance of financial institutions.

3.3.5 Social Return on Investment (SROI)

Whereas other section of this chapter included environmental factors, SROI specifically looks at social returns. It aims to alter the financial bottom line into a double bottom line, based upon both financial and social returns. According to the New Economics Foundation, "Social Return on Investment (SROI) is a framework for measuring and accounting for this much broader concept of value; it seeks to reduce inequality and environmental degradation and improve wellbeing by incorporating social, environmental and economic costs and benefits" (New Economics, 2009, p. 8).

According to the framework developed by the New Economics Foundation, SROI can be calculated through six stages: (1) Establishing scope and identifying stakeholders, (2) Mapping outcomes, (3) Evidencing outcomes and giving them a value, (4) Establishing impact, (5) Calculating the SROI and (6) Reporting, using and embedding. The heart of the calculation, stage five, is enabled by the data gathered in stages three and four. For example, in stage three one might establish the relation between an investment in the rehabilitation of prisoners and a reduction of second time offenders, potentially reducing tax expenditure on prisons and foregone taxes on labor. In stage four, one might assess the contribution of the investment to the established causal relation. In step five, the value of the impact can easily be calculated from the results of stages three and four. A similar method can also be used in order to measure the impact of investments aimed at environmental outcomes. Therefore, it is relevant to consider the method of SROI for the design of the tool proposed in this thesis.

3.3.6 Sustainability Accounting Standards Board (SASB)

A not-for-profit organization, the SASB concerns itself with providing public corporations the necessary materials and decision-useful information in order to maintain sustainability accounting standards. Moreover, the SASB provides forms of education in an attempt to advance a use of these standards. Similar to the GRI, the SASB not necessarily focuses on the financial sector, but rather includes all sectors of the economy in their sustainability standards framework. It can be distinguished from the GRI, however, on the grounds of the SASB working in concert with the current system, integrating its standards into the Form 10-K filings from public companies with the U.S. Securities and Exchange Commission (The SASB, 2017).

Focusing on the financial sector, it becomes apparent that emphasis is put on the direct impact of financial institutions by the SASB. The 'Materiality Map' published by the SASB reports on the relevance of five sustainability issues with regard to ten different sectors. They conclude that when considering the 'Financials' sector, environmental issues will "not likely to be material for any of the industries in sector" (The SASB, 2017). This claim is true only when the invested capital impacting environmental issues is *not* considered as a financial institution's own emissions. In section 3.2, however, it was concluded that this indirect impact actually is the most relevant impact to be measured (Figure 3). Therefore, the SASB fails to cover all sustainability aspects for the financial sector. Additionally, no specific reference is made to the SDGs by the SASB as of yet, limiting its relevance for this specific thesis.

Table 4 - Overview of commonly accepted sustainability frameworks in the financial sector

Framework	Description	Relevance for proposed tool
LCA	Using standardized Life Cycle Assessments, the indirect impact of financial institutions can be quantified by multiplying its share of the total capital invested in a product/project with that product/project's direct environmental impact.	The methodology of measuring indirect impact of a financial institution by its share of capital invested in a product/project is an approach worthy of exploring for the proposed tool. LCA methodology might be substituted for the SDG approach.
IRIS	Has created hundreds of metrics relevant for the financial sector, offering handles to measure its environmental impact both directly as well as indirectly. Does not offer the possibility to rank the performance, or form any judgement with regard to the performance.	The metrics introduces by IRIS might be relevant for measuring certain aspects of the SDGs, or at least offer good insights. SDGs themselves, however, are not covered, thus leaving room for the proposed tool to be of added value. Besides, the proposed tool would be able to rank different financial institutions based on their environmental sustainability performance.
GRI	Supports sustainability reporting across all sectors of the economy. Specifically addresses parts of the indirect impact of financial institutions. However, its goal of inclusion has resulted in a lax TBL approach. Moreover, SDGs do not play an important role.	Lessons can be learned from the GRI framework in terms of how it deals with assessing the financial sector's indirect environmental impact. Contributions can be made to it by including the SDGs, and offering ways of scoring and ranking the assessment tool's outcomes.
GABV Scorecard	The GABV Scorecard both quantitatively and qualitatively assesses the indirect sustainability performance of financial institutions based on the TBL-principles and offers means to rank outcomes.	Rather than based on the TBL-principles, the proposed tool is based on the SDGs. This would greatly enhance communication given the popularity of the SDG framework.
SROI	Aims to systematically measure an investment's contribution to social development in both quantitative and qualitative sense.	Even though the SROI methodology does not cover contributions to environmental impact, its method can be useful for the creation of the proposed tool. Especially stages three and four could be carried over as a best practice into the proposed tool.
SASB	Offers a framework incorporating sustainability standards into the current reporting system via the U.S. Securities and Exchange Commission's 10-K filings. Financial sector is only one of many sectors included in the framework, focusing only on direct environmental impact of financial institutions.	SASB does not include the SDGs as of yet. The quantified approach is interesting for the proposed tool and best practices can be carried over. The tool proposed in this thesis can overcome the shortcomings of the SASB by addressing both the SDGs and the indirect environmental impact of a financial institution.

3.4 Conclusion of Literature Review

After a closer examination of the United Nation's sustainable development goals, this chapter continued with exploring academic and practitioner literature in an attempt to answer the first two sub question of this thesis. The first sub question, *''How can the financial sector contribute to sustainable development?'',* has resulted in the distinction of four clusters, which have been presented in the *Sustainability in Finance Spectrum*. These four clusters represent the different manners in which financial institutions may contribute to sustainable development: (1) Legal compliance and profitability, (2) Risk mitigation, (3) Socially Responsible Investing and (4) Impact and Social Finance.

The identification of these four clusters is an important step in the process of creating the tool proposed in this thesis. Evidently, the assessment tool should reward sustainability practices in the far-right end of the Sustainability in Finance Spectrum with a higher score.

The second sub question of this thesis, *''Which methods currently exist to measure the sustainable development performance of financial institutions?''*, has shown that currently no generally accepted SDG based assessment method exists for financial institutions. It has also shown that the most leverage on sustainable development can be achieved when the primary focus is on the indirect impact of a financial institution. Lastly, an important finding is that commonly the volume of a loan or investment in relation to the total portfolio is considered and plays an important role in assessment methods. These findings will be carried over into the design of the tool that has been proposed in the introduction of this thesis.

An overview of sustainability assessment methods for the financial sector can be found in table four. The content of this table clearly indicates the two-faced scientific gap that still needs to be overcome: Currently popular sustainability assessment frameworks used in the financial sector are (1) not sufficiently focused on the indirect environmental impact of financial institutions' impact, even though this form of impact is the result of such institution's core business activities and/or (2) no popular sustainability assessment frameworks have successfully integrated the UN's sustainable development goals framework as of yet.

4. Design of the System

Based on the literature study and interviews with nine qualified financial sector experts, this chapter will elaborate on the design process of the system proposed in this thesis. The structure of this chapter is similar to the structure presented in the methodology (section 2.3, figure 1). This means that in section 4.1 (System Definition) the requirements and the resulting conceptual design will be discussed, as well as the detailing of the high-level conceptual design. Section 4.2 (System Design and Development) is concerned with the actual prototyping of the tool. Lastly, verification and validation of the tool will occur in section 4.3. The objective of this chapter is to provide an answer for the final three sub question addressed by this thesis.

4.1 System Definition

The creation of a proper system definition is of utmost importance for the successful development of the assessment tool, as it forms the basis for all further design decisions. Distinctions will be made in this section regarding the users, their needs, requirements and constraints. This first section is based on the interviews and literature study in order to create a high-level, conceptual design of the proposed system. The following question will be addressed throughout this section:

> *''What are the requirements and specifications of an assessment tool based on the UN's SDGs, capable of assessing environmental sustainability of financial institutions' core business activity?''*

4.1.1 Requirements and Specifications

The 'fourth primary ingredient' mentioned by Sage and Armstrong to describe their definition of (system) design and development is: "*A successful design and development must be broadly responsive to client needs and requirements.*" (Sage & Armstrong, 2000, p. 47). The main research question refers to 'Financial Institutions' as the subject of analysis. Therefore, the first section of the requirements and specifications phase concerns itself with identifying those actors who might have an interest in analyzing financial institutions. Secondly, after the users have been identified a description of their needs will be presented, which are based on interviews with a selection of experts belonging to the identified group of users. Thirdly, constraints for the tool design are identified and clustered. Lastly, the previously identified needs are transformed into requirements of the tool design.

The User

Firstly, it is important to elaborate upon the users/clients of the proposed tool (referred to in this section as 'the user'). Potential users of the tool can be divided into two separate groups: (1) those stakeholders who have an interest in the (environmental) sustainability performance

of financial institutions and (2) those stakeholders who want to assess and improve their own strategy of impacting the United Nation's SDG agenda.

The first group contains a wide range of stakeholders, e.g. clients deciding which financial institution to trust with their money, investors deciding which financial institutions to invest in, employees deciding whether to work for a certain financial institution or regulators/civic society with an interest in keeping track of the sustainability performance of financial institutions. The second group of stakeholders consists of financial sector entities interested in assessing their own sustainability conduct. One reason for a financial institution to perform a self-assessment is for the company to gain a better understanding with regard to its current position on environmental SDG alignment, so that they might improve their SDG strategy going forward. An overview of identified stakeholders can be observed in Appendix XI.

The main focus during this thesis has been on the second group of users. This group was chosen due to the large GABV network of financial sector practitioners who could be approached for an interview. Additionally, the financial institutions themselves are the actors that have the highest impact on the (environmental) sustainability practices of the financial sector. Out of the eight non-anonymous in-depth interviews conducted for this thesis, six interviewees work for a financial institution that could potentially benefit from using the proposed system. The other interviewees work in fields closely related to the financial sector.

Needs

"*Needs are a condition requiring supply or relief and indicate a lack of something required, desired, or useful*" (Sage & Armstrong, 2000, p. 120). In total, the interviewees working for financial institutions collectively stated 17 needs; 17 conditions they thought indicated something required, desired or useful in the context of a system capable of assessing environmental sustainability of a financial institution's balance sheet based on the SDGs. The complete list of needs and interviewees can be found in Appendix IV, along sides with a description of each of the described needs.

Considering the fact that each interviewee listed needs independently from the answers of the other interviewees, naturally a lot of overlap between the 17 needs exists. Therefore, the 17 needs have been reduced to eight needs using a self-interaction matrix. The process and result of the self-interaction matrix is described in Appendix V. Table 4 shows the clusters, or *need categories*, that were created from the needs listed by the interviewees[4].

The 'theory of change' category describes the need for a customizable assessment methodology. A theory of change can be a very useful methodology for promoting societal change. It works by identifying long-term goals, for which theoretical causal relations are described in order to work back towards certain factors that can be stimulated/mitigated in order to achieve the desired societal change. Collecting data on the right criteria is essential in order to empirically proof the existence of the causal relations, or adjust them so that the relations may be improved accordingly (Odell, 2015; Copestake et al, 2005). This need for customization, however, means that it directly inhibits another identified need, consistency. For

[4] The created *need categories* are the author's personal interpretation of the conducted interviews.

the assessment tool to be consistent, it should be used in a similar fashion, scoring on the same criteria and sourcing data from comparable assets. For this reason, only seven categories of needs will be considered moving forward, which are addressed below table five.

Table 5 - Need categories per interviewee

Need category	Related needs mentioned	Interviewee mentioning need
Efficiency	Simplicity	Ms. Veltmeijer
	Simplicity	Mr. Rohner
	Practicability	Mr. Sikking
	Efficiency	Ms. Veltmeijer
Consistency	Clear Policies	Mr. Sprengers
	Consistency	Ms. Veltmeijer
Objectivity	Stimulate the good	Mr. Rohner
	Include the bad	Mr. Rohner
	Objectivity	Ms. Veltmeijer
Transparency	Open Source	Mr. Sprengers
	Transparency	Mr. Sikking
Adaptability	Bottom-up	Mr. Sprengers
	Iterative	Mr. Sikking
Materiality	Materiality	Mr. Condon
Data Availability	Strong Metrics	Ms. Merchant
	Information Availability	Mr. Condon
Theory of Change	Theory of Change	Ms. Merchant

Efficiency

The need for efficiency indicates that it is important for a system to not unnecessarily drain the user's resources. Yet at the same time, it is important that each assessment is conducted diligently enough so that its results are meaningful. This need refers to the common trade-off between quality and the necessary resources, measured in either time, money or otherwise. Efficiency has been referred to by the interviewees as a need for simplicity (2x), practicability and efficiency itself. Efficiency has been chosen to name this category, as it refers to the need of simplicity, yet also incorporates the need for high quality.

Consistency

It is important in terms of communication purposes for the system to be consistent. This means that the chosen criteria are similar for each assessment. Moreover, different financial institutions using the tool should all be held to the same scoring method. Considering the fact that the tool will be used for self-assessment, consistency is important to make sure that the scores remain comparable between assessments. Consistency was grouped together with another indicated need: clear 'policies'. During the interview, it was mentioned that clear policies were necessary so that companies could be compared on equal grounds, resulting in similar assessments even though different employees/investees were involved. Consistency and

‘clear policies’ were both mentioned in slightly different contexts in the interview, yet the idea behind the two needs is similar enough for them to be grouped in one category.

Objectivity

During several interviews, it became clear that financial institutions source a lot of their sustainability information from third party sources. Examples are other for-profit companies’ reports (e.g. Sustainalytics), government issued reports (e.g. on human rights) and non-profit organizations’ reports (e.g. on social rights for workers down the supply chain of large multinationals). When data is gathered from third party sources, it is pivotal to remain objective in the assessment of this data.

According to one of the interviews (Ms. Veltmeijer – Triodos IM), NGOs occasionally tend to focus their resources on investigating firms with a strong brand name for the reason of increased media exposure. It is a financial institution’s responsibility to not be swayed by one-sided reports when assessing an entire industry – just because less condemnatory evidence exists on a company’s competitors, does not necessarily mean that these companies perform better in terms of environmental and social sustainability. Actually, the contrary might be true in certain cases, knowing the weaker points in a company’s supply chain for example, enables the financial institutions to more effectively engage with its investee.

The need ‘objectivity’ was grouped together with the described needs ‘stimulate good’ and ‘include bad’. These needs were also listed in an attempt to stress the importance of objectivity throughout the assessment tool.

Transparency

Throughout the interviews, twice it was argued that perhaps one of the more important characteristics of the proposed tool would be for it to be transparent. Both Mr. Sikking (PGGM) and Mr. Sprenger (ASN Bank) stated that it is a misconception that comparable tools should be designed from a single company’s perspective. The ultimate goal is to positively impact the sustainability practices throughout the financial sector in an attempt to maximize the positive impact in general. This goal is achieved through sharing expertise with other companies who might be looking into the same issue. This approach of open source allows for companies to collectively work toward one goal, rather than independently research the same problems and potential solutions.

Adaptability

The need for an adaptable tool originates from the notion that the tool should be built from the ground up and must be easily adaptable to changes. The tool will never be perfect the first time it is launched; it should be built in such a way that improvements in the design are easily incorporated. This need category is based on need number seven, which indicates a need for an iterative tool, and need number 13, which indicates a need for a bottom-up tool.

Materiality

Materiality in this context refers to the quality of being relevant or significant. This need is founded upon the necessity of meaningful criteria. Due to constraints in both monetary and financial resources during the execution of an assessment, only limited amounts of data can be

gathered and processed. Therefore, it is essential that the criteria on which information is collected represent the most key issues in the context of the assessment. For the tool proposed in this thesis, it is not realistic to implement all environmental indicators of the in total 230 SDG indicators – collecting data on all of these would be too time consuming. Therefore, only the most relevant indicators will be chosen to serve as criteria for the assessment tool.

Data Availability

Lastly, it has been argued in several interviews that it is important to account for the availability (and the lack thereof) of data. Especially considering the fact that the SDGs have only been introduced recently, historical data trails will not be available for some of the indicators. When developing in detail the proposed assessment tool, it then becomes important to take into account the nature (quantitative or qualitative) and the abundance of available data, so that the criteria may be chosen accordingly.

Constraints

Several constraints were identified and are introduced in this section. The constraints were divided in groups related to the design of the system. The following groups were created: (1) Tool constraints, (2) Input constraints, (3) Process constraints and (4) Output constraints. Table 5 contains an overview of the constraints and their corresponding constraint categories.

Table 6 - List of output constraints and corresponding group

Constraints	Group
The software chosen for the design and execution of the tool shall be commonly available at financial institutions.	Tool Constraint
Using the proposed tool, an assessment shall be completable within a reasonable amount of time.	Tool Constraint
The tool shall exclusively make use of environment related SDG indicators and factors as its criteria.	Input Constraint
The tool shall predominantly make use of qualitative data, limiting the usage of quantitative input.	Input Constraint
The tool shall weigh all criteria equally when processing the information.	Process Constraint
The mitigation factor important for the final score of the assessment shall be self-proposed by the person completing the assessment.	Process Constraint
The output shall be limitedly quantitative due to the qualitative nature of the input.	Output Constraint
The output shall be automatically generated once the assessment has been completed, limiting the option of customization in the reporting phase.	Output Constraint

Tool constraints

Previously, financial institutions were identified as the main user of the proposed tool. Therefore, it is important that the software chosen to run the tool is commonly used throughout financial institutions, eradicating any software-related threshold for a financial institution to start using the tool. For this reason, Excel was chosen to run the tool relying on macros programmed in VBA to ensure consistency in the data input process.

An often-cited need by the interviewees also indicates a constraint; efficiency of the system means that the assessment must be completable within a reasonable amount of time. This means, however, that the tool can only feature a limited number of criteria.

Input constraints

The sustainable development goals related to the environment and their respective indicators will form the basis for the input criteria. Not all environmental SDG indicators are actually relevant for the environment (e.g. goal seven, related to sustainable energy, suggests among other indicators also to measure the access to energy – this is important for development, but not necessarily for environmental sustainability). The remaining relevant indicators led to a fixed list of 24 criteria (section 4.1.2 – Claims of Positive Impact) which surely does not represent an exhaustive list when it comes to environmental sustainability.

Besides the criteria, also constraints regarding the data input used to measure the criteria can be identified. For many of the criteria, it is not yet clear how input can be measured quantitatively. As a result of this constraint, at this point it is only possible to allow for qualitative data to be used as an input for the assessment.

Process constraints

Ideally, the criteria used for the input of the tool would be weighed differently depending on the relevance of a criterion. The Gap Frame is the result of a study that has translated the SDGs into nationally relevant issues. For example, water scarcity and therefore water quality might be a very pressing issue in some parts of the world (California, parts of Africa or Australia), whereas the same issue might be far less important in other parts of the world (Canada, the Amazonas or Scandinavia). The SDGs themselves currently do not allow for this nuance to be incorporated (Muff, Kapalka, & Dyllick, 2017). Weighing the criteria used in the system according to the needs per region could be a solution, however, at this point such a measure is outside the scope of this thesis.

The score generated after completing the assessment is based on a calculation taking into account a self-proposed mitigation factor (section 4.1.2 – Negative Impact Factors). This factor completely relies on the opinion of the person performing the assessment, constraining the consistency and objectivity needs identified earlier in this chapter.

Output constraints

To some extent, the output will be constraint by the qualitative nature of the input, as it does not allow for a very specific scoring of the assessment. The specific scoring of the completed assessment would be desired, as it allows for the ranking of financial assets based on their environmental sustainability SDG score.

Additionally, the output of the assessment itself is an automatically generated PDF through Excel/VBA tool. Automatically generating the PDF allows for a high usability of the tool, which is important in the design of any tool (Pervan & Arnott, 2005). However, it also means that the result of the assessment cannot be tailored to the wishes of the user without significantly altering the tool itself.

Requirements

As described in previous sections, the needs for the proposed tool were derived from interviews with potential users of the tool. However, during a 30- to 60-minute interview there is only so much time available to deep-dive into the requirements of the tool – defining those characteristics that are essential for the tool to actually fulfill the needs of the interviewee. Therefore, in order to derive the requirements forming the foundation of the needs, an objective tree was created which can be found in Appendix VI. During this stage of the design process, only a preliminary scan of requirements was completed. The overview of the results (needs – requirements) of the objective tree can be found in table 7.

Table 7 - List of requirements identified per need

Need	Requirement
High Efficiency	Short Assessment Time
	Few Errors in Assessment Computation
	Many Criteria per Category
High Consistency	High Standardization of Output
	Few Different Criteria per Output
	High Standardization of Input Dialogue Boxes
	High Reproducibility
High Objectivity	Good Ratio Negative Impact Factors and Positive Impact Factors
	High Standardization of Data Input
High Transparency	Few Black Box Calculations per Assessment
	High Transparency in Criteria Weights
	High Transparency in Criteria Sources
High Adaptability	High Ability to Improve Assessment Process
	Quick Adaptability of Assessment Process
	Frequent Adaptability of Assessment Process
High Materiality	High Impact of Criteria
	Frequent Impact of Criteria
Good Data Availability	Few Blanks per Assessment
	High Quality of Data Input

4.1.2 Conceptual Design

Building on the previous sections, the aim of the remainder of this chapter is to describe the pathway towards a prototype design. Throughout the two sections of the conceptual design stage, the needs, constraints and requirements identified in section 4.1.1 – Requirements and Specifications, will be guiding. The goal of this chapter is to facilitate the construction of a functional prototype tool. Having a functional prototype of the tool is important as it allows for clear communication towards stakeholders.

The conceptual design section will follow an interpretation of the conceptual design structure recommended by Sage and Armstrong (2000). Firstly, high-level system flowcharts will be developed to give the system concept a functional structure (System Architecting). Secondly, the decision criteria will be specified based on the needs, constraints and requirements previously identified (Architectural Specifications).

System Architecting

The following section contains an abstract, high-level description of the tool, visualized in system flowcharts. In order to gain a better understanding of the tool and to learn what the tool actually looks like in reality, please consult Appendix XII. This Appendix contains screenshots of the tool, matching the content of the flowcharts depicted in figures 5, 6 and 7.

The inputs, processes as well as the outputs have to be further defined before a functional prototype can be created. In order to facilitate this process, it is helpful to restate the goal of the tool, which is to assess a group of assets based on their environmental sustainability using the (indicators of the) SDGs as criteria, so that asset groups can be ranked based on their environmental sustainability score. Within a group of assets, not every asset will affect the same (indicators of) SDGs. Therefore, the asset groups will have to be broken down into smaller sets of assets up to the point that either (1) all assets within the group affect the same (indicators of the) SDGs or (2) the assets can no longer be broken into smaller parts.

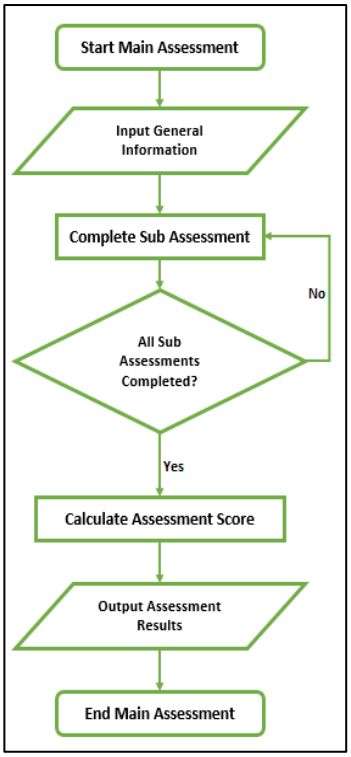

Figure 5 - Flowchart of the main assessment process

Keeping in mind that the 'overall assessment' is based upon several 'sub assessments', it becomes clear that two phases should be distinguished in the system process. Firstly, the overall assessment should be designed in such a manner that it can process general information. Moreover, it should be capable of combining all sub assessments, ultimately resulting in an overall score. Secondly, to generate the input for the first process, hereafter called the *main assessment*, sub assessments should be conducted for each individual asset (group). To clarify this idea, the following to sections will elaborate on both the main assessment and sub assessment(s), by graphically representing the processes in system flowcharts.

Main Assessment

The start of the main assessment is also marks the beginning of the tool. The flowchart, figure 5, begins and ends with self-explanatory terminals. After the main assessment is initiated, general information regarding for example the person conducting the assessment, the company name and date are requested. The first process in the flowchart represents the start of the sub assessments. The sequences of this process are not elaborated upon in this section. The process of completing sub assessments is repeated until all sub assessments are completed, as is represented by the first decision shape.

The second process calculates the overall score, based on the weighted average of all sub assessment scores. This process will further be described in the prototyping section under calculations. The product of the assessment is a coherent overview of all inputs in such a way that reporting is standardized, making it easy to compare asset groups based on their environmental sustainability, even between two separate financial institutions. Therefore, the output of the assessment results is a very important part of the tool design, which will be further elaborated upon in a later stage (section 4.2.1 – Output). With the output of the main assessment results, the tool process comes to an end, finishing the entire assessment.

Sub Assessment

The sub assessment process which was described as a black box in figure 5, can be broken down in two parts. The first part (figure 6) represents those steps of the process leading up to the point where a user form is created in Excel. This part thus represents all steps that need to be undertaken in order to select the criteria applicable to the individual asset (group).

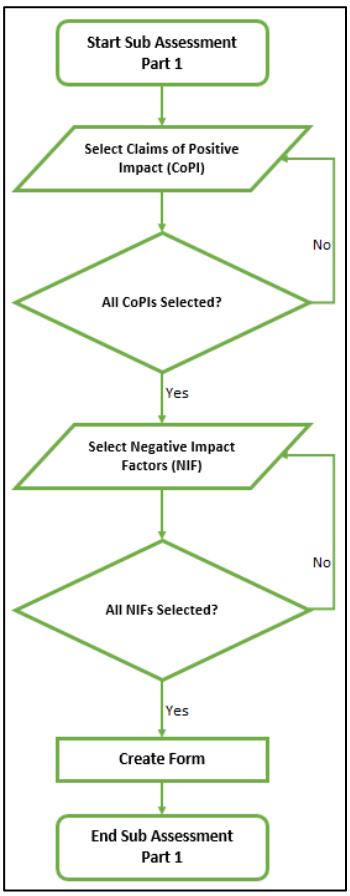

Figure 6 - Flowchart of the first sub assessment process

Before the user form can be created, two input steps are required. Firstly, all claims of positive impact (CoPI) that apply to the asset (group) being assessed need to be selected. Only when all CoPIs are selected, the process may move to the second step. During the second step, all negative impact factors (NIF) that have been linked to the asset (group) must be selected. Only after these two input steps have been completed, should the form be created. The exact meaning of CoPI and NIF will be explained in detail in the next section (Architectural Specifications).

Creating the user form is a process on its own as well. It considers the CoPIs and NIFs as input, and creates a form accordingly. However, for the scope of this thesis it is not relevant to explain these steps in detail as it is not related to decisions regarding the SDGs or the asset (groups). The user form code has been written in the VBA programming language of Microsoft. The second part of the sub assessment (figure 7)

represents all steps of the sub assessment that are taken after the user form has been created in Excel. Firstly, it is important that more general information regarding the asset (group) is collected. The total value (expressed in the applicable currency) of the asset (group) is an important criterion for calculating the overall assessment score (section 4.2.1 - Calculations). Furthermore, an asset (group) name (or ID) has to be specified in order to keep track of the individual assessments.

Secondly, the dialogue boxes that were automatically created in the user form need to be populated. These dialogue boxes correspond to the SDG indicators the asset (group) can be linked to and the negative impact factors earlier specified. It is important that all dialogue boxes are populated to ensure readability of the automatically generated report.

As will be explained further in the following section, it is important to include the chance for incorporating mitigating factors into the assessment. An asset (group) for which the negative impact factors can be mitigated following a certain strategy, should not be punished equally in the assessment score as an asset (group) for which the negative impact factors cannot be mitigated. It is important to complete all mitigation strategies and mitigation factors before the finals steps are completed.

After all dialogue boxes in the user form have been populated, three more processes have to be completed before the sub assessment comes to an end. The first and third process are 'create preview' and 'store data of assessment' respectively. These two processes, like the 'create form' process in part one, do not need to be further explained, as the process is not related to either the SDGs or the asset (group). These processes are both coded in VBA. The second process 'calculate score' is relevant for the final output of the assessment and will be further detailed in section 4.2.1 - Calculations.

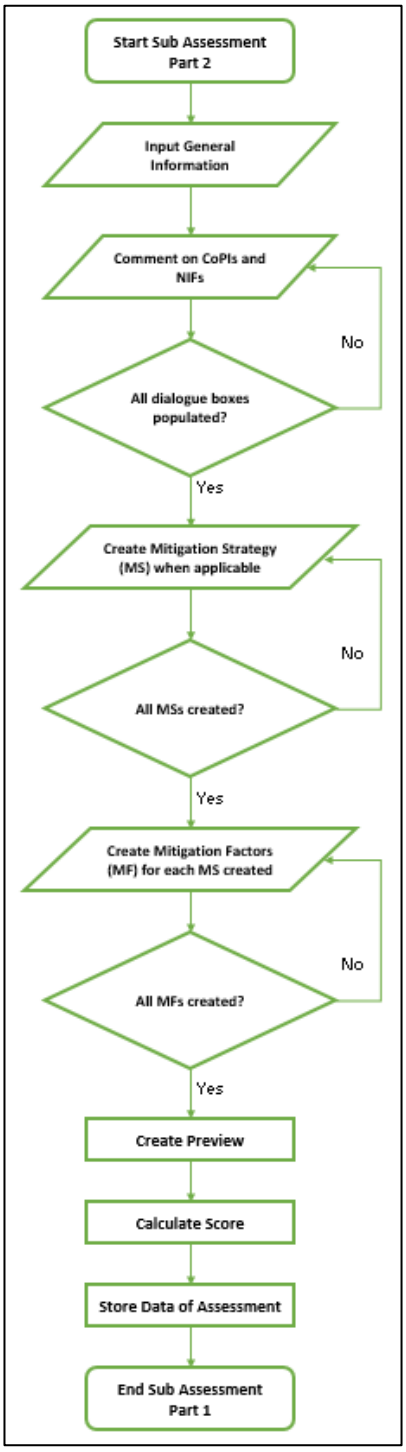

Figure 7 - Flowchart of the second sub assessment process

Figures 6 and 7 together represent the process 'complete sub assessment', which was described as a black box in the main assessment section.

Architectural Specifications

In this section, specifications of the decisions made during the system architecting phase will be elaborated upon. The following topics will be further specified in this section: claims of positive impact, negative impact factors and the mitigation strategy & factor.

Claims of Positive Impact

Considering the interview results, it has become apparent that currently none of the companies interviewed assess the sustainability of their assets using the SDGs as leading criteria. Instead, the SDGs are merely linked to their existing criteria. Therefore, it is not in the interviewed companies' interest for the tool to fundamentally assess the assets using the SDGs, as this would result in the double assessment of assets (assuming that the introduction of this tool does not directly result in the stakeholders abandoning their in-house developed assessment methodologies). The extra work necessary for a reassessment would simply drain a financial institution's resources to the point at which it is no longer beneficial for a financial institution to use the tool. This concern was identified in the previous section regarding needs as the need for efficiency.

Instead of reassessing the assets' environmental sustainability, the tool should give the freedom for the financial institutions to use their in-house developed methods that link the self-assessed sustainability of their assets to specific SDGs and their targets/indicators. However, considering the scope of the proposed tool, linking the sustainability of assets to the SDGs should be limited to only those SDGs that actually impact environmental factors. In order to understand how an SDG affects environmental factors, it is important to look at the targets and indicators of the relevant SDGs. Figure 8 shows a graphical representation of the SDGs that actually impact environmental factors.

Figure 8 - Overview of environment SDGs (green) and other SDGs (red)

Surely non-environment related SDGs are equally important to the bigger picture of sustainable development. If a standardized environmental sustainability assessment for asset groups as proposed in this thesis is indeed successful, it is recommended to include the remaining SDGs as

well. For now, however, only SDGs 7, 11, 12, 13, 14 and 15 will be considered for the criteria used in the proposed tool. Goal number six poses a grey area; 'clean water and sanitation' surely touches the environmental side, however, its main purpose is to promote social development through stimulating for example cleaner drinking waters. Purely environment related indicators, such as indicator 6.3.1 "*Proportion of waste water safely treated''* and target 6.6 "*By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes''* show great amounts of overlap with other SDGs. For example: indicator 6.3.1 can also be covered by indicator 12.4.2 *''... proportion of hazardous waste treated, by type of treatment''* and target 6.6 can be covered by indicator 14.2 *''By 2020, sustainably manage and protect marine and coastal ecosystems ...''*. For this reason, SDG six 'clean water and sanitation' is not yet considered as part of the system's scope at this point. Sustainable Development Goals number 7, 11, 12, 13, 14 and 15 have been identified by the United Nations as being relevant for environmental factors (United Nations Environment Porgramme, 2013).

In order to further comply with the identified need *materiality*, it must also be noted that not all targets and indicators attributed to the six SDGs related to environmental factors are equally important in light of the environment. For example, improving on indicator 11.1.1 *''Proportion of urban population living in slums, informal settlements or inadequate housing''* not necessarily qualifies as being beneficial for the environment. The same applies for indicator 7.1.1 *''Proportion of population with access to electricity''*; allowing more people to have stable electricity might be good for the development of poorer areas, but is not necessarily beneficial for the environment. Therefore, not all targets and indicators of the six environmental SDGs will be considered.

Figure 9 displays a materiality matrix, mapping on the y-axis the relevance of an indicator for a financial institution asset and on the x-axis the impact of an indicator on environmental factors. This mapping is conducted through a common-sense, qualitative approach. Appendix VII contains a table indicating the six environmental SDGs and a complete list of their respective targets and indicators. Before creating the materiality matrix, however, it must be noted that all targets and indicators indicated by an alphanumerical sequence are high-level government targets, which have been pre-assumed to not rank high enough on the y-axis of the materiality matrix – the relevance of an indicator for a financial institution asset.

Excluding the high-level government targets, 48 out of 65 indicators present in Appendix VII remain. All 48 indicators have been considered for the materiality matrix, but only those within the 10x10 range measured from the upper right corner will be used to form the basis of the criteria in the proposed system. In order to improve the readability of the tool, the wording has been changed slightly on all indicators, and some indicators were referred to by the description of their respective target (e.g. 'Red List index alone, indicator 15.5.1, is not a very indicative criterion for the user of the tool). The complete list of the 24 indicators/criteria have been slightly adopted for usage in the tool and are called 'Claims of Positive Impact'.

To improve usability of the tool, the 24 CoPIs that are used in the tool have been grouped into six themes, largely following the SDGs that the criteria are based upon. The only differences are that SDG 14 and 15 have been combined to the group 'Biodiversity' and SDG 12 has been split

up in 'production' and 'consumption'. The six themes are: (1) Energy, (2) Climate, (3) Cities, (4) Production, (5) Consumption and (6) Biodiversity. The complete list can be viewed in Appendix XII – table 12.

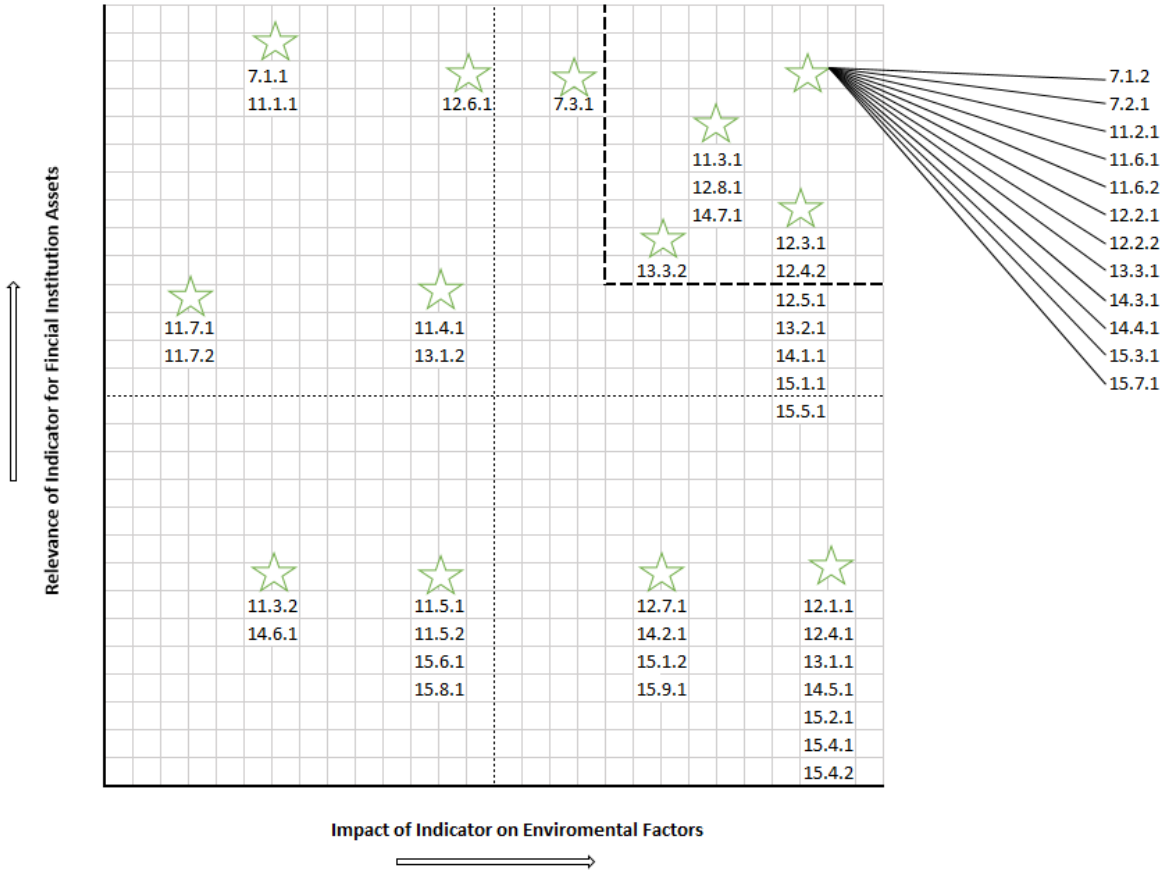

Figure 9 - Materiality matrix specifying relevant indicators

Negative Impact Factors

It is obvious that there is a need to include criteria indicating a positive impact on environmental sustainability when developing a tool that does precisely that. However, in order to comply with the earlier identified need for 'objectivity' it is also important to include factors that have a negative impact on sustainability factors. It was identified during the interviews that it is important to look further than merely the environmental SDGs when including negative factors. The following fictitious example was provided during one of the interviews[5]:

> *''Imagine we could invest overseas in a biological cotton farm. Surely that would meet our positive-screening criteria. However, if very harsh and abusive labor conditions apply to this farm, or if there is any form of child labor involved, the farm would obviously no longer qualify for investment.''*

[5] The example was freely translated and interpreted from a Dutch interview (Rosl Veltmeijer – Triodos IM) and is therefore not a literal quote.

Figure 10 graphically describes the concept that an asset (group) should: (1) be rewarded with a high score in case it positively impacts environmental factors, (2) be penalized with a low score in case it negatively impacts any other SDG related factors and (3) have a chance to repair the low score in case a decent and proven strategy can be applied in order to mitigate the negative impact.

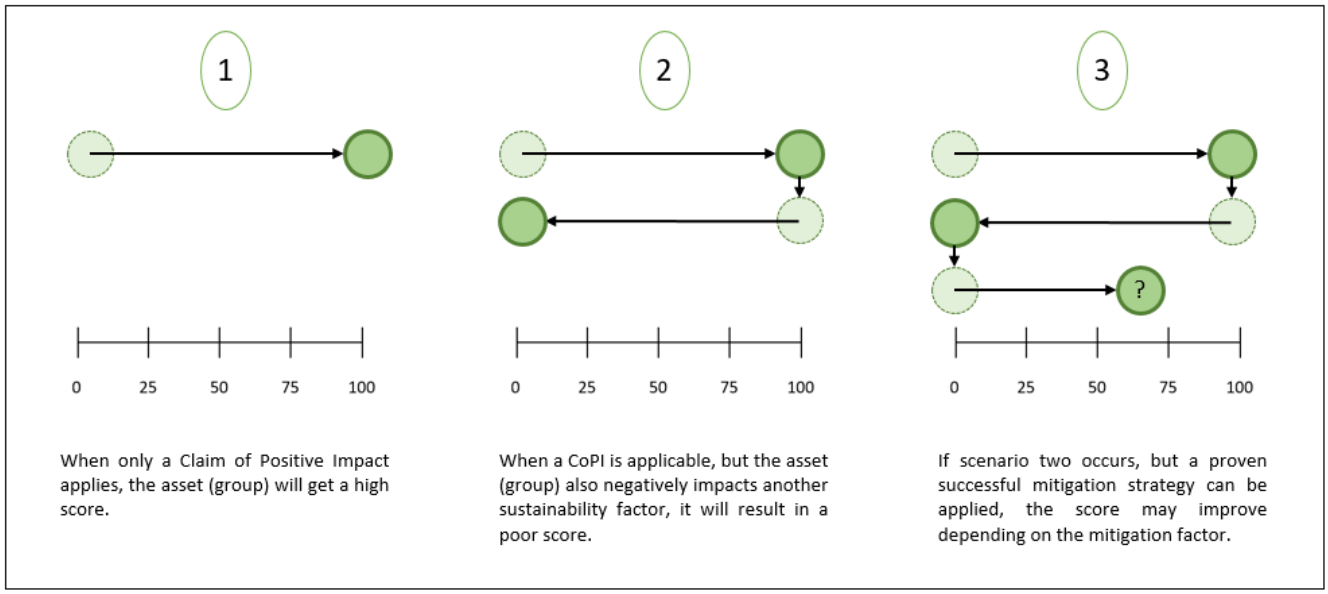

Figure 10 - Graphical representation of scoring procedure

The negative impact factors remain at this stage of the tool design in an aggregated form. This means that the twelve categories that can be chosen as negative impact factors are not further developed into specific factors, as was done with the claims of positive impact. The twelve negative impact factors that can be selected are all based on the SDGs and are as follows: (1) Energy, (2) Climate, (3) Cities, (4) Production, (5) Consumption, (6) Biodiversity, (7) Gender equality, (8) Poverty, (9) Health & Well-being, (10) Education, (11) Work & Growth and (12) Equality. Further defining the negative impact factors and allowing for quantification of these factors is recommended for future work.

Mitigation Strategy & Factor

As can be observed from figure 10, the environmental sustainability score of an asset (group) that impacts one of twelve NIFs should still be able to receive a partial score, if the negative impact can be mitigated following a credible strategy. At this point, the system design will not yet allow for an objectively quantified mitigation strategy (MS) to be implemented. Ideally, however, the quantification of both the negative impact factors, as well as their respective mitigation strategies would be supported by the tool. For now, it is up to the user of the tool to write down a credible strategy and implement a mitigation factor (MF), ranging from 0-100%. In case no credible mitigation strategy exists for the negative impact factor, the lowest environmental sustainability score possible will be awarded to the asset (group). The innerworkings of the calculation will be further addressed in section 4.2.1 - Calculations.

4.2 System Design and Development

4.2.1 Prototype Design

Prototyping the tool is part of the 'System Design and Development' phase (figure 1). Prototyping is important to ensure fruitful communication with stakeholders and potential end users, so that in further stages the design may be adjusted according to comments and remarks of both groups. Surely, a prototype is not a finished product. Regardless, it is important for the prototype to feature as many functionalities of the proposed tool as possible to ensure successful communication. The following sub question is addressed in this chapter:

''What can a working prototype of the assessment tool proposed in this thesis look like?''

This chapter will outline the final stage of creating a working prototype by addressing the following topics: (1) Output, (2) Input and (3) Calculations. Appendix VIII contains screenshots of the prototype output, as well as a link to an introductory video of the tool. These sources can be consulted in order to gain a better understanding of the tool.

Output

Firstly, the output will be discussed in this section. Considering that the outputs are aligned with the identified needs and requirements, the exact inputs necessary to achieve these outputs have been chosen accordingly. During the interview phase, it was identified that at this moment, no financial institution was concerned with using the SDGs or its targets/indicators for the assessment of their financial assets. Instead, other methods were used to perform the assessment, the results of which were sometimes linked to the SDGs. Therefore, the tool proposed in this thesis does not intend to measure and quantify environmental sustainability using the SDGs and its targets/indicators. It rather attempts to enable financial institutions to systemically link their in-house developed assessment methods to the SDGs in such a manner that the results may be compared within and between financial institutions.

In order to aid this goal of the tool, several output characteristics are going to be important. Firstly, a comparable 'environmental sustainability score' must be provided, both for individual assets (groups), as well as the sum of all assets assessed. Secondly, in order to easily compare the results of two assessments, the results must be presented in identical lay-outs. Thirdly, the actual linkages to the SDGs must be presented in the result.

Environmental Sustainability Score

It is important that the calculated score facilitates comparisons between assessments. Therefore, the score must be specific enough in order for a ranking to be meaningful. On the other hand, the assessment tool contains no quantitative elements at this point; creating a specific and numbered environmental sustainability score might give a false sense of accuracy in the scoring. This introduces a tradeoff. Either a specific score (e.g. 0-100) or an unspecific score (e.g. -- / - / 0 / + / ++) can be chosen. Bearing in mind that the need for comparing scores is crucially important for the goal of this tool, and that improving the ability of the tool to handle quantitative figures is recommended for future work, at this point the decision was made to express the individual as well as the overall assessment score in a figure ranging from 0 to 100.

Layout

In order to make asset portfolios of financial institutions easily comparable on the basis of their environmental sustainability performance, a standardized layout must be created after the assessment is completed. In the design stage, it was therefore chosen that an automatically generated PDF file should become available after completion of the assessment. Appendix VIII shows an excerpt of this automatically generated reported, consisting of the overview page, linking pages and an excerpt of an individual asset (group) assessment. Figure 11 is a screenshot of the overview page, with indications as to where specific outputs are placed.

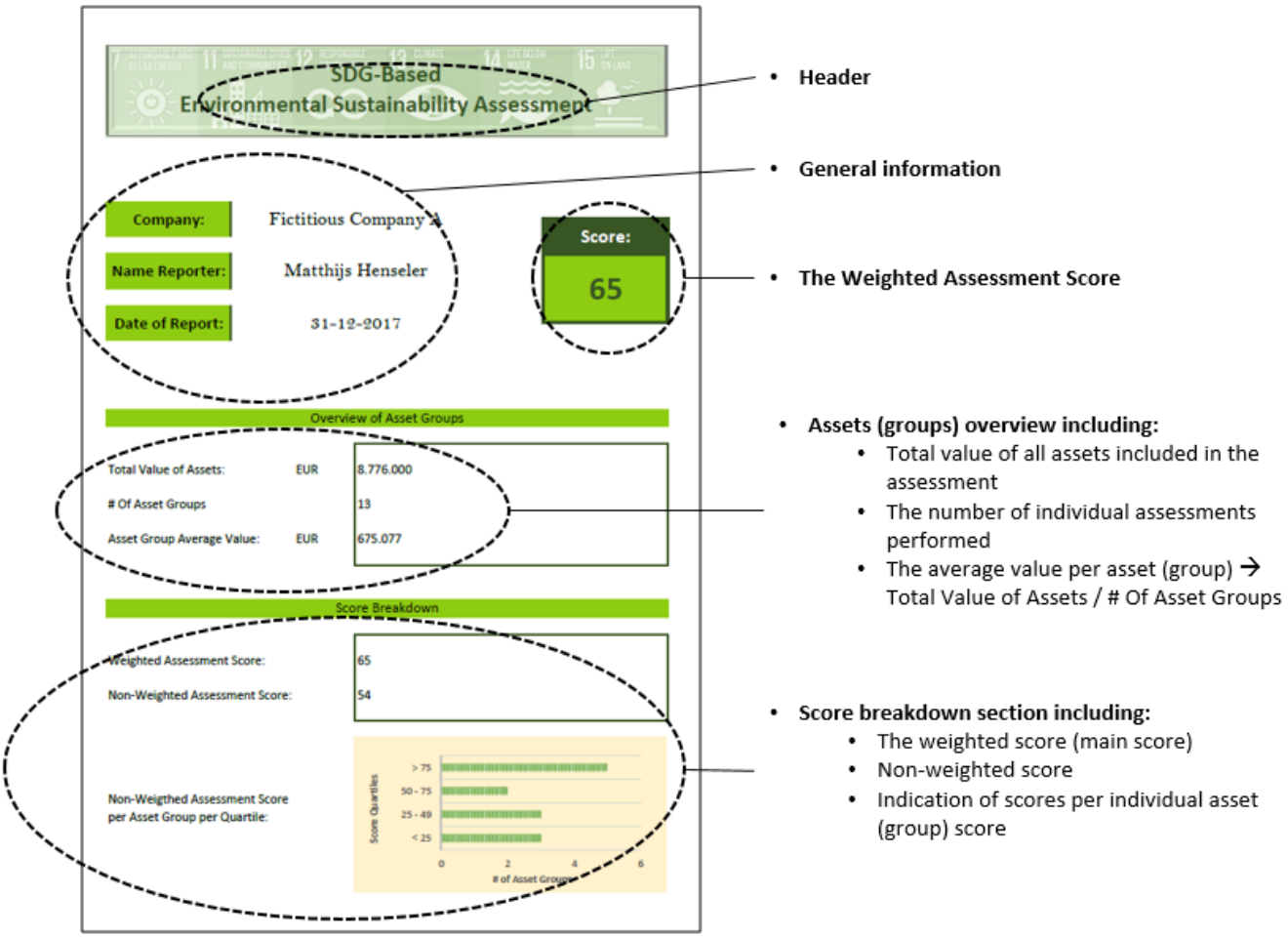

Figure 11 - Screenshot of the tool's overview page

Linking the SDGs

After each individual asset (group) has been assessed, an overview of its relation to the appropriate SDGs should be displayed. This enhances the communication between a financial institution and its stakeholders when addressing the topic of SDGs. Again, it is important that this representation is standardized visually, textually and for the criteria that need to be met, before alignment with any SDG can be claimed. Appendix VIII shows how the link to SDGs is graphically outputted in the standardized result PDF.

Input

As was previously made clear, Excel has been chosen as the software platform in which the tool was developed and in which the tool shall be used. In total, the complete Excel file counts 14 worksheets. Three worksheets are exclusively for data storage and can be hidden from the user. The remaining 11 worksheets might require at some point a form of interaction. In this section, the worksheets (moving up from worksheet 1 to 11) will be addressed according to the input they require.

- Firstly, he user finds him or herself on the introduction page. This page includes instructions on how the tool should be used, plus a table that requires general information to be inputted.
- Secondly, worksheet two contains four icons that offer the following options (from left to right): (1) Clear entries – all selections in worksheets 4 to 10 are cleared, (2) Start Assessment – a hyperlink that brings the user to the first relevant worksheet for starting the assessment, (3) Create PDF – when all indidvidual assessments have been completed, the create PDF button automatically generates a PDF file on the storage location of the user's choice and (4) Empty Assessment Storage – if the user wishes to start all over, this button can be used to clean all previously conducted assessments from the system.
- Thirdly, the user is offered to choose from one out of six environmental impact themes which the asset (group) may affect. In order to increase usability, the tool makes as much as possible use of icons.
- Fourthly, worksheets 4 to 10 are populated with the claims of positive impact and the negative impact factors.
- Fifthly, on worksheet 11 the user may generate the user form that allows for commenting on the CoPIs, NIFs, MSs and MFs.

The User Form

In the prototype version, only five CoPIs and five NIFs may be selected. In order to ensure credibility of the result file generated at the end of the assessment, it is crucial that the user populates the textboxes with the most accurate information possible. Populating the textboxes in the 'mitigation strategy' section is optional, as such a strategy might not always exist. The user must then input "0" for the mitigation factor, automatically reducing the individual asset (group) score to zero. The option to implement a mitigation strategy will only appear when at least one negative impact factor has been selected.

Upon completing the user form, the user is required to first create a preview of the completed sub assessment, followed by calculating the score with clicking on the score button and lastly the user is required to store the sub assessment using the store button. Clicking 'store' means that the assessment is saved in an output-only worksheet which is the source for the automatically generated assessment document.

Calculations

The most important calculation throughout the entire assessment is calculating the environmental sustainability score (ESscore) for the sub assessments. The ESscore is the product of two components, the positive impact claim score (PICscore) and the negative impact factor score (NIFscore).

$$ESscore = PICscore * NIFscore$$

The positive impact score in the prototype version is always *100* if there is at least one CoPI selected during the sub assessment. Obviously, if no CoPI has been selected throughout the sub assessment, no points can be awarded for the sub assessment.

The NIFscore is the result of the number of negative impact factors selected and the mitigation factors appointed. In principle, if a negative impact factor cannot be mitigated, the result should always be an environmental sustainability score of zero. Therefore, the following formula was created in Excel:

$$NIFscore = \text{MAX}(0, \frac{100 - ((SUM(negative\ impact\ factors\ selected) * 100) - SUM(mitigation\ factors))}{100})$$

This will result in a NIFscore ranging between 0 and 1, bearing in mind that the sum of the mitigation factors will never exceed the number of negative impact factors selected. Therefore, the formula satisfies the conditions that: (1) the ESscore should range between 0 and 100 and (2) the ESscore should be zero whenever a negative impact factor cannot be mitigated.

In figure 11 (section 4.2.1 - Layout) it can be observed that in the overview page two separate scores are calculated for the main assessment. The 'weighted' and 'non-weighted' score. The weighted score is the result of multiplying individual sub assessment score with their respective sub assessment values, divided by the total value of the main assessment:

$$Weighted\ Assessment\ Score = \frac{SUM(sub\ assessment\ score * sub\ assessment\ value)}{Total\ value\ main\ assessment}$$

The non-weighted score is simply the average value of all sub assessment scores. It was derived from the interviews as well as the literature review, that it is common practice when assessing assets to weigh them according to the value of the asset. Hence the weighted score has been chosen as the main score visible in the layout. However, it is also important to feature the non-weighted score in the overview, as a large discrepancy between the two scores might indicate an unrepresentative weighted score, for example because one particular asset (group) heavily influences the height of the score due to a large asset value.

Weighing Claims of Positive Impact

In future versions, the option of weighing the CoPIs should be explored. Based on the idea that not every SDG indicator is equally relevant depending on the region of the world, Muff, Kapalka & Dyllick (2017) created the GAP framework. This framework specifies per region which sustainable development goals are critical issues, and which goals are relatively unimportant. As an example, the GAP framework identifies SDGs related to 'society' as crucially important for Southern Africa, whereas for North America SDGs related to 'planet' are indicated as being crucially important. Therefore, investing in planet related assets, such as a renewable energy power facilities, should be extra rewarded when the asset is located in Northern America. At the same time, when investing in society related assets, such as a modern health care facility, should be extra rewarded when the asset is located in Southern Africa.

4.3 Verification and Validation

The evaluation of the prototype tool designed in the previous chapter will be of main concern in chapter five. The goal of this chapter is to answer the fifth and final sub question of this thesis:

''To what extent is the proposed environmental sustainability assessment tool based on the SDGs usable and valid?''

The operative words in this sub question are usable and valid, which correspond to the title of this chapter, verification and validation, respectively. Verification refers to the correctness of the tool in terms of its operational workings. Therefore, during the verification phase the tool was tested on whether the equations work correctly, the system process is executed in the designed order, the output is presented correctly, etc. In section 5.1, the verification phase is completed through a case study, any findings with regard to functional errors during the application of this case are reported.

Validation refers to the correctness of the tool in terms of the tool meeting the prespecified needs and requirements, which have been the focus of sections 4.1.1 - Needs and 4.1.1 - Requirements. In order to determine whether the tool has met the objective specified in this thesis (section 1.3 – Research Objective), an interview has been conducted with an expert in the field of assessing (sustainability) of financial institutions. The results of the validation phase are shown in section 4.3.2 – Expert Opinion.

4.3.1 Case Application

In order to test the applicability of the tool in a real-world scenario, the prototype tool was put to work on a case with real data. The case selected for the execution of the verification phase is based on a fund managed by a wholly owned subsidiary of the ASN Bank. The nature of the case that was selected for the verification of the prototype tool is not relevant, as the outcome is only relevant to the extent it is correctly produced considering the input; a normative judgement on the environmental sustainability of the fund is not part of the verification phase. Besides, any outcomes from a prototype tool are to be interpreted with caution.

The reason that this fund was selected for the case study is because of the accessible reporting style of the ASN Bank and great transparency. Mr. Sprenger, one of the interviewees and head of the sustainability policy and research department for the ASN Bank, had previously pointed out the transparent reporting style of the ASN Bank. Since the purpose of the verification phase is to verify the tool only, and not to form any judgement on the environmental sustainability of the fund, only the ten largest asset groups of the fund were included during the assessment; including more asset groups would not necessarily contribute to the verification of the prototype tool. The fund that was chosen is in line with the nature of the tool, meaning that it primarily focuses on environmental impact factors. The fund is called 'ASN Environment & Water Fund'.[6]

The first 11 worksheets may require an input from the user at some point during the assessment. Therefore, the inputs that were necessary during the assessment of the chosen case will be discussed firstly. After completion of each sub assessment and the main assessment, calculations will be performed by the tool. These calculations will be addressed secondly. Thirdly and finally, the verification phase will address the output of the prototype tool. The tool automatically generates a standardized PDF; it is essential that the output is created according to the prespecified requirements.

Input

In section 4.1.2 – System Architecting, flowcharts outlining the structure of the proposed tool were presented. The Input/Output blocks featured in these flowcharts will be discussed in order to address the inputs necessary for completing the ASN Environment & Water Fund assessment.

- The first input block requiring general information functions without failure.
- The second input block is concerned with the selection of the 'Claims of Positive Impact'. The selection of these functions properly both visually (green when selected and red when unselected) and operationally (the trackers in the 'Data_Storage' worksheets report a '1' when selected and '0' when unselected.
- The third input block refers to the selection of the 'Negative Impact Factors'. The selection of the NIFs works similar to the CoPIs and functions according to design.
- The fourth input block refers to the general information that is requested upon creating the user form. Due to the fact that the volume of the asset/asset group in a monetary value is required for further calculations in the system, an unintended error message occurs when not filled in. This should be replaced with an intended message, asking the user to fill out a value for the asset/asset group.
- The fifth input block requires the user to populate all dialogue boxes corresponding to the selected NIFs and CoPIs. Only those NIFs and CoPIs selected earlier appear and the input functions according to the design.
- The sixth and seventh input blocks correspond to the mitigation strategies and mitigation factors respectively. Both input blocks show no sign of incorrect behaviour when the information from the case is applied.

[6] 'ASN Environment & Water fund' is a free translation into English from the original Dutch name: 'ASN Milieu & Waterfonds'.

Calculations

In some of the building blocks of the flowchart calculations are performed. These calculations appear in so-called process blocks. Calculations occur in two process blocks: (1) 'Calculate Score' – referring to the score of a sub assessment and (2) 'Calculate Assessment Score' – referring to the overall score of the complete case assessment. As can be seen in the output of the assessment, which has been added to Appendix VIII, all scores are within reason and correspond well with expected outcomes.

In a separate sensitivity analysis, however, a single error was found upon entering an above reasonable figure for the 'Mitigation Factor'. Under normal circumstances, a mitigation factor should be entered between 0 and 100. Any figure above 100 also results in sub assessment scores greater than 100. This problem can be prevented in future versions by limiting the maximum input of the respective dialogue box to 100.

Negative scores are prevented using a 'MAX()' function in the 'Data_Storage' sheet of the prototype system. Non-numerical inputs are also prevented for the mitigation factors. Overall instructions on the input requirements should be improved in the assessment form, in order to prevent any confusion during the completion of sub assessments.

In the output of the assessment two overall scores are shown on the first page. The weighted score is corrected for the monetary volume of each sub assessments. The unweighted score is simply the average of all sub assessments. The calculation of these scores works according to expectations.

Output

The output of the tool is created when the user selects the 'Create PDF' button in the 'Start_Assessment' worksheet. Selecting this button also initiates the calculation process of the overall score. In future versions is should be possible to preview the score without yet creating the PDF.

The lay-out of the PDF is constructed automatically and can be reviewed after the completion of each sub assessment in the 'Assessment_Storage' worksheet. It can be observed that the output is generated without abnormalities. The second and third page showing the alignments with the SDGs, however, is not yet generated automatically and was added manually for the purpose of communication Appendix VIII – figures 14 and 15.

4.3.2 Expert Opinion

In order to test the validity of the prototype tool, two experts in the field of financial institution (sustainability) assessments were asked for their opinion in an unstructured interview. The interview protocol and responses can be found in Appendix IX. The purpose of this validation phase is to test whether the tool meets the needs and requirements of its users. The central question is not whether the tool functions according to the design, but whether the tool design itself is correct.

Interview A

The first interviewee, Mr. Korslund, is the senior economist to the Global Alliance for Banking on Values and oversees all activities regarding the GABV scorecard method and the research on the business case for sustainability-focused banking. Additionally, Mr. Korslund has worked a lifetime in private sector financial institutions. Therefore, Mr. Korslund is qualified to provide an expert opinion regarding the validity of the proposed tool.

The interview consisted of two parts: (1) a theoretical part and (2) a practical part. The theoretical part mostly concerns itself with the underlying assumptions forming the basis of the system, such as the system's needs. The practical part includes a tour through the system and an example output. The assessment on the ASN Environment and Water Fund, which was used earlier during the verification phase, also forms the foundation for the practical part of the interview.

Theoretical Part

Firstly, Mr. Korslund was presented with the need categories that have been created in section 4.1.1 – Requirements and Specifications. He argued the list to be sufficiently exhaustive at a first glance, but thought 'Data Availability' to perhaps be a sub-need within the 'Efficiency'. The three most important needs according to Mr. Korslund are (1) Materiality, (2) Efficiency/Data Availability and (3) Objectivity. Hence, overriding priority in the design (e.g. in case of design tradeoffs) of future versions should be given to these needs according to the interviewee.

Secondly, Mr. Korslund was asked to comment on the content of section 4.1.2 - Negative Impact Factors. He agreed that the idea of the scoring tool was correct – alignment with SDGs should be rewarded, the involvement of negative impact factors should result in a lower score, which must be repairable through mitigation factors. However, Mr. Korslund was missing certain nuance in the current versions of the prototype. He suggested that the highest score should only be reward if either multiple SDGs are positively affected, or if the impact of the SDG alignment is very large (e.g. measured in terms of company revenue in case of the ASN Environment & Water Fund assessment). The current version of the tool only measures impact in a binary way (i.e. either there is (a negative) an impact on an SDG, or there is no impact registered at all). Similarly, the 'Negative Impact Factors' should not automatically reduce a score to zero, but should alter the score according to the seize of the negative impact.

Thirdly, the 'Mitigation Strategies' and 'Mitigation Factors' should be defined more concretely. Ideally, this part of the assessment contains measures that can be tracked over time. To support his view, Mr. Korslund provided the following example:

> Imagine an organic farm using migrant labor. In principle, the organic farm could obtain a good score in the environmental assessment, as the biological farming can be beneficial for the environment when compared to alternative farming methods. However, in case the migrant labor is used inappropriately and under abusive circumstances, this should significantly lower the score. Only if the mitigation strategy includes measures that can be tracked over time, showing the improvements in circumstances due to the mitigation strategy, the score can be partially repaired.

Fourthly, the item of scoring the assessment was discussed in the interview. Considering the qualitative nature of the assessment, Mr. Korslund showed concerns that a score ranging from 0 to 100 would suggest an unreasonable level of accuracy for a qualitative assessment. Rather, a five-category scale (e.g. -- / - / 0 / + / ++) would be more appropriate.

Fifthly, Mr. Korslund was asked to comment on a screenshot of the score overview page (Appendix IX – figure 18) and on a screenshot of the SDG alignment page (Appendix IX – figure 19). Regarding the overview page, Mr. Korslund stated that he misses a comparison to peer groups, which could provide context necessary to judge the environmental sustainability performance of an asset/asset group. In light of the SDG alignment page, Mr. Korslund mentioned that including an indication of the magnitude of the impact per SDG would be a good addition. Similar to what was mentioned in the second point of this section, this magnitude could be measured for example using the (percentage of) revenue of a company that actually impacts the SDG. The following example can provide clarity:

> Image a large multinational active in the energy sector with a major focus on oil and gas. If this company occasionally invests in activities that have an alignment with an SDG (e.g. an investment in a windfarm aligns with SDG number seven – Renewable Energy), in the current prototype this company would score a maximum score. However, if these investments only make up a small percentage of the total company's revenue, it should not be rewarded with the maximum score.

Sixthly, Mr. Korslund was asked to comment on the qualitative nature of the assessment. In his response, he mentioned that ideally a combination of both qualitative and quantitative inputs would be required from the user. In particular, Mr. Korslund stressed the benefits of quantifying the impact of the asset/asset group. This quantification must not necessarily occur through monetization. As an example, it was mentioned that the impact of a renewable energy project could also be quantified according to the number of households provided with electricity generated from the project. Another example of non-monetary quantification is the impact of an organic farm measured in the meals provided on an annual basis.

Seventhly and lastly, Mr. Korslund commented on the task of dividing the content of the sub assessment into groups or individual assets, up to the point that division would no longer result in different overall assessment outcomes. He agreed that this was the right approach, however, Mr. Korslund also stated that a standardized protocol is missing. Without a protocol describing how a portfolio of for example mortgages should be divided into individual assets or asset groups, the user will be left in confusion.

Practical Part

The tool works straightforward and no important comments were made on the functionality of the system[7]. However, Mr. Korslund stated his concern that currently it is not sufficiently clear for whom the tool is designed. As was described in section 4.1.1 – The User, the tool is intended for two distinct groups of users. On the one hand, there are the stakeholders who want to

[7] The functionality of the system was mostly important in the verification phase and was therefore less considered during the validation phase.

determine where it is best to do business from the perspective of (environmental) sustainability, such as clients, investors, employees regulators and civil society. On the other hand, there are the financial institutions themselves who would like to improve their strategies to deliver support to the UN's SDG agenda. Future versions should consider the distinction between these two separate groups of users in a more defined manner according to Mr. Korslund.

Interview B

The second interviewee, Mr. Thuysbaert, is a senior evaluation officer for FMO (the Dutch development bank). With a PhD in economics and having worked for several years on the cross section of finance and development, Mr. Thuysbaert can be considered an expert in his field.

Theoretical Part

Firstly, Mr. Thuysbaert noted that the list was largely complete in his opinion, although he was lacking a need referring to the fact that the tool should be able to track differences in an asset's impact on sustainability over time. He named this need *accountability*. When asked to rank the needs, Mr. Thuysbaert answered the following three needs to be most important: consistency, objectivity and transparency.

Secondly, with regard to scoring the assessments, Mr. Thuysbaert argued that the qualitative nature of the tool's input was a drawback for the objectivity of the tool. He mentioned that it could be of added value to the scoring of the assessment if the user was asked to rank the impact of an asset on the SDGs (in case an asset impacts more than one SDG). Additionally, he mentioned the importance of regional discrepancies when assessing the importance of an SDG; including this aspect could further contextualize a positive impact.

Thirdly, Mr. Thuysbaert argued that a score of 0-100 would probably not work when comparing scores of assessments conducted by two different companies. Considering the limited objectivity of the tool, he argued that it would be difficult to state that a score of 66 conducted by company X would be worse than a score of 67 conducted by company B, since the limited objectivity introduces a certain range of uncertainty.

Fourthly, Mr. Thuysbaert showed concern with regard to the usability of the tool when a portfolio consists of hundreds of assets. The readability of the report would also suffer from this amount of data, where Mr. Thuysbaert specifically referred to the *SDG linking pages*. He suggested that it would probably be a good idea to further aggregate these outcomes, as well as the inputs in some cases.

Practical Part

When introduced to the prototype tool itself, Mr. Thuysbaert made several comments with regard to the validity of the tool. First of all, he argued the approach not to be entirely balanced, considering that social factors are only accounted for when an asset is screened for a negative impact. Secondly, Mr. Thuysbaert stressed the importance of incorporating more nuance in the scoring process, stating that a negative and a positive impact would rarely be of the exact same magnitude. Thirdly, Mr. Thuysbaert mentioned that not every positive aspect should reward a perfect score, as this undermines objectivity.

Finally, Mr. Thuysbaert mentioned the fact that negative impact factors are considered as well as a good feature of the tool, noting that this part is often overlooked in other tools. He also appreciated the pre-selection of positive impact claims (architectural specification – figure 9),

which he thought was approached very well. As a final recommendation, Mr. Thuysbaert mentioned that without fully quantifying the inputs, objectivity could still be improved by asking the user to divide a fixed amount of points over all the positively impacted SDGs, in order to rank their relevance for the asset.

4.4 Conclusion

Throughout the fourth chapter of this thesis, Design of the System, in total three sub questions have been addressed. Collectively, the three sub questions have resulted in the design, creation and validation of the prototype tool that was proposed in the beginning of this thesis. This section will concern itself with reflecting on and answering the three sub questions that have been addressed in the three previous sections of this chapter.

4.4.1 System Definition

The following sub question found itself at the heart of the conceptual design section:

> *What are the requirements and specifications of an assessment tool based on the UN's SDGs, capable of assessing environmental sustainability of financial institutions' core business activity?*

In order the answer this sub question, four topics were addressed based on the work of Sage and Armstrong (2000). Together, these four topics form the answer to the addressed sub question. Firstly, the users of the proposed tool were identified. It became clear that two groups of users exist: (1) those stakeholders who have an interest in the (environmental) sustainability performance of financial institutions and (2) those stakeholders who want to assess and improve their own strategy of impacting the United Nation's SDG agenda. Due to the limited scope, however, the main focus was on the second group of users.

Secondly, via interviews the needs of this user group were identified. An extensive overview of these needs (presented per interviewee) can be found in Appendix IV. After clustering the needs to prevent any overlap between them, the following 'need categories' remained: (1) Efficiency, (2) Consistency, (3) Objectivity, (4) Transparency, (5) Adaptability, (6) Materiality and (7) Data Availability.

Thirdly, four groups of constraints were identified in relation to the conceptual design of the tool: (1) Tool constraints, (2) Input constraints, (3) Process constraints and (4) Output constraints. The content of each of the constraint groups has been summarized in table 5 (section 4.1.1 – Constraints).

Fourthly, through the creation of an objective tree, the requirements in relation to the earlier identified needs were specified. In total, 19 requirements have been identified, which effectively operationalize the identified needs. This step was important, as it makes for a more tangible design which was essential for the actual construction of the tool (section 4.1.1 – table 6).

The second part of this section concerned itself with the system architecting and architectural specifications (section 4.1.2 – Conceptual Design). The system architecting steps were conducted using flowcharts to describe how the processes of the tool follow up on each other.

These blueprints for the prototype tool are visualized in figures 5, 6 and 7. The architectural specifications resulted directly in the criteria that can be found in the actual tool.

4.4.2 System Design and Development

This section of chapter four was concerned with the development and construction of the prototype tool. This endeavor is also described by the following sub question:

> *What can a working prototype of the assessment tool proposed in this thesis look like?*

The actual construction of the prototype was completed keeping in mind the architectural specifications and has been described according to the outputs, inputs and calculations present in the tool (section 4.2.1 – Prototype Design). Textually concluding this sub question adds little value; rather it is recommended to view the results of the prototyping phase in Appendix XII, the introductory video presenting the tool, as well as the tool itself.

4.4.3 Verification and Validation

Lastly, the prototype tool was verified and validated. The usability of the tool was tested through the application of a real-word case, the ASN Environment & Water Fund. The validity of the tool was assessed through an interview with an expert in the field of financial institution (sustainability) assessments. The following sub question encompasses the idea of this section:

> *To what extent is the proposed environmental sustainability assessment tool based on the SDGs usable and valid?*

It can be concluded that the current version of the prototype is sufficiently usable to create the output as it was designed during the previous sections, when applied to a case. An excerpt of the output of the case is presented in Appendix VIII. The goal of the verification phase was not to form a normative judgement on the environmental sustainability of the ASN Environment and Water Fund; this fund was merely selected for reasons of data transparency and accessibility. It can be concluded that the usability of the tool is compromised by a few operational errors, which are summarized in table 8.

With regard to the validity of the system, the interviewees commented on multiple aspects of the system design. The interviewees displayed content with regard to the idea behind the tool and supported the notion that there is indeed a scientific and reporting gap when it comes to environmental sustainability assessments of financial institutions' core activities, based on the SDGs. However, considering the execution of the tool design, Mr. Korslund and Mr. Thuysbaert both mentioned several recommendations to ensure a closer fit to user needs in future versions of the tool, thereby increasing its validity. These recommendations have been discussed extensively in section 4.3.2 and are summarized in table 9.

Table 8 - List of verification outcomes

Topic	Issue	Potential Solution
Input	Unintended error message when no value is presented in the 'Value Asset/Asset Group' dialogue box.	Present an intended error message when the user tries to generate a score without having populated the dialogue box 'Value Asset/Asset Group' in the user form.
	The 'Value Asset/Asset Group' dialogue box accepts all inputs. Rather, it should only accept numerical values.	The same code written for the mitigation factor dialogue boxes should be applied to the 'Value Asset/Asset Group' dialogue box.
Calculations	Mitigation factors greater than 100 results in a sub assessment score great than 100 as well.	Either the formula calculating the score should be protected using a 'MIN()' function, or the input dialogue box should be limited to a score of 100.
Output	The SDG alignment page is not outputted correctly in the current version.	Future versions, a tracker should be added that stores in the 'Data_Storage' page which SDGs have been linked to which sub assessments. Using the information stored by the tracker, an automatically generated page can be included when creating the PDF.

Table 9 - List of validation outcomes

Topic	Issue	Recommendation	Mentioned By
Scoring	Scoring currently does not include sufficient amount of nuance.	Before the maximum score is rewarded multiple SDGs should be impacted and the impact should be substantial.	Mr. Korslund, Mr. Thuysbaert
	Regional discrepancies between importance of SDGs are not considered.	Make the user assign weights to the impact of an asset on the SDGs according to their relevance.	Mr. Thuysbaert
	A score on the scale of 0-100 suggests an unreasonable level of detail for a qualitative assessment.	Considering the current qualitative nature of the tool, it would be recommended to implement a five-category scale.	Mr. Korslund
Mitigation	The mitigation strategies and factors are not concretely defined.	A mitigation strategy and corresponding factors are to be included only when the mitigative impact is measurable and improvements can be tracked over time.	Mr. Korslund
Output	There is no context provided with the overall assessment, making it difficult to judge the performance of the assessed.	Including a reference to the performance of peers in scoring page would make it possible to judge the performance.	Mr. Korslund
Input	Current input relies heavily on qualitative data, whereas a combination between qualitative and quantitative data would be ideal.	The impact on SDGs could be quantified by including measurable KPIs (e.g. for a renewable energy project – how many households are provided with electricity?).	Mr. Korslund, Mr. Thuysbaert
	The current situation creates ambiguity with regard to the process of deciding when to use a group of assets and when to use individual assets.	A clear protocol should be created as a supplement to the tool, describing the process of asset selection.	Mr. Korslund
	Social factors are considered only during the negative screening of the asset's impact on sustainability. This results in an unbalance.	Including in future version also the social SDGs would greatly improve the tool.	Mr. Thuysbaert

5. Conclusion and Recommendations

The fifth and final chapter of this thesis will reflect on the main research question introduced in the beginning of this thesis. It will do so by concluding the thesis, as well as providing recommendations for the further development of the proposed system and reflecting on the current system-version's limitations. Firstly, section 5.1 provides the conclusion of the thesis. Secondly, section 5.2 consists of a discussion on the limitations and implications of this research. Thirdly, section 5.3 delivers the recommendations. Lastly, section 5.4 contains a personal reflection on the research that has resulted in this thesis.

5.1 Conclusion

In the introduction of this thesis the following problem was introduced: "It is not clear what a tool capable of assessing the environmental sustainability of financial institutions in the UN's common language of sustainable development, the SDGs, looks like". Arguments in favor of the existence of such a tool were provided early on as well; a discrepancy between genuine considerations for sustainability and marketing-based considerations for sustainability among financial institutions make it hard for consumers to orient themselves when choosing a financial services provider.

Given the rapidly rising popularity of the United Nation's Sustainable Development Goals, the potential exists for communicating the impact of a financial institution's sustainability practices through this universal language of sustainable development. Therefore, this thesis addressed the following main research question: "How can the sustainable development goals proposed by the United Nations be used in a systematic approach to objectively and transparently measure the impact on environmental sustainability brought about by financial institutions?".

Following a series of systems engineering steps based on the work of Sage and Armstrong (2000), an early version (prototype) of a system (tool) was designed in order to answer the main research question. The first step of the system design process, based on interviews and a literature review, resulted in the following list of system needs: (1) efficiency, (2) consistency, (3) objectivity, (4) transparency, (5) adaptability, (6) materiality and (7) data availability. These high-level needs were used to derive an exhaustive list of 19 system requirements, which formed the foundation of the subsequent stages in the tool design and development process.

Besides needs and requirements, tool constraints were also determined early on in the design process. The following three constraints are considered most impactful in the development phase. Firstly, the software environment in which the tool has been developed had to be universally known and easily adaptable. Therefore, it was decided that the tool was to be programmed in Microsoft's visual basic for applications programming language through the Excel environment. Secondly, although other universally accepted sustainability frameworks

exist (e.g. PRI, GRI, IRIS), the tool developed in this thesis only considered the UN's SDGs as acceptable inputs. Thirdly, although a combination of both qualitative and quantitative information is preferred, for the first prototype resulting from the design efforts mostly qualitative factors have been considered.

The prototype tool which was ultimately designed based on the needs, requirements and constraints identified earlier, uses a three-step approach in scoring assets/asset groups assessed by the tool. Firstly, any linkage to SDG indicators that were found to be relevant for the financial sector results in a maximum score. However, a negative impact in any of the seventeen SDGs, reduces this score to the minimum, which can only be repaired in case a proven successful mitigation strategy can be implemented, effectively reducing the negative impact.

In the verification and validation steps of the prototype tool, it has become apparent that although the tool is functional and usable, it is only to a certain extent valid. The validity of the tool was tested through an expert interview (Appendix IX). The results of this interview show ample room for improvement of future versions of the prototype tool. The issues identified by the expert are presented in table 8 (section 4.4.3 – Verification and validation).

Ultimately, the design of the tool forms an adequate answer to the main research question. Although not without shortcomings (as with any prototype system), the tool created for this thesis effectively uses the SDGs to gauge a financial institution's indirect impact on environmental sustainability.

5.2 Discussion

The previous section concluded that a systems design approach is effective in using the SDGs in a systemic and transparent effort to gauge indirect environmental sustainability impact of financial institutions. The extent to which the prototype designed throughout this thesis is effective, however, will be the topic of discussion in section. The research is constraint by several limitations (section 5.2.1). Moreover, the practical implications of the prototype tool will be discussed as well (section 5.2.2).

5.2.1 Limitations

The final version of the tool is limited in several aspects. In order to increase usability of the tool, standard protocols should be created to guide the user through the system. For example, in the current version it is not self-explanatory to what extent asset groups should be subdivided into individual assets. If the designed tool is to successfully enable comparisons of indirect environmental impact between financial institutions, using the tool should be more straightforward to prevent comparing apples and oranges.

Furthermore, the tool is limited by the qualitative nature of the assessment. As was mentioned during the validation phase of the tool, the qualitative nature makes that an assessment score between 0 and 100 gives an unrealistic level of detail. This could be solved by introducing a five-category scale in the scoring part of the tool. The drawback of such a scoring method, however, would be that it limits the potential for comparisons between an assessment with its peers.

Hence, the true limitation that should be addressed is the qualitative nature of the prototype tool.

The tool output is also limited in the sense that a score on its own is meaningless, without providing context of peer performance. Currently, the scoring page does not provide any of this necessary context. This results in the outcome of the assessment being limited in its purpose of providing clarity to the user of the tool with regarding to the environmental sustainability performance of the financial institution.

The limitations of the research are not exclusively applicable to the tool itself; the research which forms the foundation for the prototype tool is limited in several ways. Firstly, even though it can be considered a strength that the needs and requirements for the tool design are based on interviews with experienced financial sector practitioners, it can also be considered a limitation that the interviewees were predominately selected based on an affinity with sustainability. This may have resulted in a biased view with regard to the necessity of an assessment tool based on the SDGs. Additionally, a list of nine interviewees may not necessarily result in an exhaustive overview of the financial sector's perspective on (environmental) sustainability.

The works covered in the literature review were selected based on the significance of the work (i.e. academic literature sorted by number cited and practitioner work sorted on how widely the work is accepted in its sector). However, the field of sustainability assessments in the financial sector develops very rapidly and significant changes might have occurred within the timeframe of this thesis (six months). Ample financial institutions independently research options for tools similar as the one described in this thesis, potentially disqualifying assumptions made early on in the design as outdated or at least as no longer unique.

Furthermore, the researcher had no experience in the design of a tool himself. This applies to both the theoretical part of the tool design (e.g. the order of design steps, iterative tool design) and the practical part of the tool design (e.g. programming in Microsoft's VBA language, reporting on prototyping steps). This may have resulted in an execution of the system design less diligently than ideal.

Lastly, the validation of the prototype tool, which has resulted in the identification of the several limitations, knows a limitation itself as well. Based on the opinions of only two experts, it can be discussed whether or not the list of identified limitations is truly exhaustive. It is likely that more extensive testing of the tool and including additional expert opinions on the validity of the tool, will result in the discovery of limitations that are currently not yet included in this report.

5.2.2 Implications

The implications of this research can be subdivided into two categories: (1) theoretical implications and (2) practical implications. Although the literature review in chapter three of this thesis only reflected on the literature, while not necessarily adding to it, the outcome of the interviews performed in light of the research can be interesting from this perspective nonetheless. Interviews with employees of three banks ((1) Rosl Veltmeijer – Triodos IM, (2) Martin Rohner – ABS Bank and (3) Piet Sprengers – ASN Bank) and one pension fund (Gert-Jan

Sikking – PGGM), showed that although all four interviewees saw the usefulness of the SDGs as a communication tool in order to discuss sustainable development impact, none of the four interviewees saw it as a reason to adopt the SDG framework into the core of their assessment process; according to the interviewees, the usefulness of the SDGs is limited to linking the outcomes of their own assessment methods to the SDGs.

The practical implication of this research lies in the potential of real-world application of the tool by users. Firstly, the tool has to be improved in order to increase the usability of the tool, as well as the validity. If new and more intensive validation processes proof the tool to be ready for application, it should be introduced to potential clients, such as financial institutions themselves, but possibly also civic society, regulators or NGOs. The influential work 'Diffusion of Innovations' by Everett Rogers describes five stages in the adoption of new innovations, such as the tool described in this thesis. During the development of the tool so far, as well as during future phases to improve the tool, the first two stages of Rogers' theory are especially relevant: (1) creating awareness among users for the tool and (2) persuading users to consider actually applying the tool in real world applications (Rogers, 1962). If successful, the tool could be useful for policy makers in the financial sector (e.g. the Dutch national bank – DNB, European Central Bank – ECB) and assist them in decision making with regarding to (environmental) sustainability in the financial sector.

5.3 Recommendations

As was mentioned in the chapter describing the methodology followed throughout this thesis, designing a system is an iterative process. That means that the current version of the tool, merely a first prototype, can be considered as the first iteration of the design process. In this chapter, several recommendations will be given to the benefit of subsequent design iterations, which ultimately should lead to a truly usable and valid tool, capable of systemically, objectively and transparently assessing environmental sustainability performance of financial institutions, based on the UN's Sustainable Development Criteria.

- The scoring considerations should be addressed in future versions of the tool. More nuance should be incorporated in the assessment process. This can be achieved for example through the weighing of criteria by making the importance of an SDG geographically depended (e.g. tackling water scarcity is more important in areas struck by droughts, fighting corruption is more important in areas scoring high on corruption indices). Another way to include more nuance in the scoring process is to only award high scores when multiple SDGs are impacted, or in case an asset/asset group has proven to positively impact an SDG with all its facets (i.e. a high percentage of the asset/asset group's economic impact, for example measured as the revenue of a company, actually impacts the SDG).

- If the proposed assessment tool is to be truly effective in distinguishing genuine sustainability from marketing-based sustainability among financial institutions and thereby providing clarity to the user, it is critical that the tool provides the score in the context of a peer group. A score on its own has little value when not compared to the performance of

similar financial institutions. Therefore, it is recommended that in future version the option is included to compare the outcome with peers.

- The qualitative nature of the tool's inputs should be extended to also include quantitative factors. Especially in the following three manners it is recommended to include more quantitative data: (1) the mitigation strategy should be tracked over time, so that the effectiveness of the mitigation strategy is proven, (2) the impact of an asset/asset group should be quantified in non-monetary terms (e.g. number of households provided with renewable energy) and (3) in case the input for the asset/asset groups are stocks of companies, quantify the percentage of the company that actually impacts an SDG (for example by using the ratio of a company's revenue positively affecting the SDGs over total revenue). The third method of including quantitative factors can also be used in the negative impact on SDGs.

- In order to increase compliance with identified needs such as efficiency, consistency, objectivity and transparency, it is recommended to include clear protocols for the different steps in the assessment, or to automate the input process further. In doing so, the chance of different assessment outcomes due to different backgrounds of the assessor is reduced. It is crucial that the personal views of the assessor do not greatly influence the outcome of the assessment, as that makes for ill comparisons among peers in case they have been assessed by different individuals.

- In future versions, it is recommended to expand the scope of the assessment tool to include: (1) more environmental criteria in order to obtain a more complete image of a financial institution's sustainability performance and (2) to include more than only environmental criteria. Following the exact same methodology, also SDGs related to good governance and social factors can be incorporated in the assessment method.

Finally, with regard to the research upon which the tool was created, it can be recommended to enlarge the group of interviewees in number, as well as broaden the group of interviewees in terms of their backgrounds. Nine interviewees might not give a complete overview of the system needs. Moreover, by including interviewees from backgrounds not necessarily related to sustainability, a broader audience of potential client's needs can be captured. Similarly, in this research only two experts were asked for their opinions with regard to the validity of the system. It is also recommended to include more opinions with regard to the tool's validity in in order to get a better understanding. Lastly, the literature review could have included more practitioner examples of financial institution sustainability assessment methods. It is recommended to further research best-practices in this field in order to potentially link these examples (e.g. PRI, IRIS, GRI, the SASB) to the tool for increased usability and visibility of the proposed assessment too.

5.4 Personal Reflection

Perhaps one of the greatest feats of this research is the significance of the topic, considering its current relevance for financial institutions. Since the introduction of the Sustainable Development Goals, the demand for SDG-based reporting has seemingly grown more rapidly than the ability of financial institutions to report on them. I am pleased to have found such a relevant topic in today's financial sector. Not just because it is easier to remain committed to a research when it is on the edge of current developments, but also because it has opened many doors in terms of willing interview candidates, as well as future career possibilities.

Undoubtedly the interest for this topic has facilitated the process of gathering the information that formed the foundation for the prototype tool that has been designed. Nevertheless, it has been my experience that actually creating a well-functioning system is a hard task. First of all, systems design is not necessarily a core component of the MSc. Engineering and Policy Analysis. Secondly, as I had very little prior programming experience, I did not initially plan to write actual code for the system. However, my curiosity led me to abandon the original plan and to start programming. I believe that the more than 2000 lines of code written for the tool in Visual Basic for Applications proof two things: (1) creating even a relatively simple prototype system requires more effort than I anticipated and (2) my programming skills are at most mediocre as I am sure any experienced programmer would not have required 2000+ lines to create a tool of similar functionality. Ultimately, however, I am satisfied with the process of writing this thesis and I am happy to have greatly improved my Excel and VBA skills.

Perhaps the hardest part of designing the tool was for me to know when to stop. Even though the tool in its current form is functional, clearly it is not finished. Some of the recommendations for the improvements of the tool also occurred to me during the design of the tool. However, given the limited time available for writing this master thesis, I had to draw a line at a certain point and not develop the tool beyond the originally specified scope. This has resulted in a tool that I believe reflects a very interesting approach to using the SDGs in an attempt to measure a financial institution's indirect environmental impact. However, it also does not go much further than being a proof of concept; by no means is the current version of the tool ready to be adopted by any serious organization.

Ultimately, I believe the structure of this thesis to be solid. The process makes sense, including both the literature review and the empirical evidence gathered through the interviews. In hindsight, however, I suppose that the interview protocol could have been designed better, focusing more on design steps of the proposed tool, rather than focusing on the tools currently used by the interviewees. Nevertheless, I am satisfied with the overall outcome.

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Appendix

Appendix I – In-depth review of the Sustainable Development Goals

The first appendix contains descriptions of all 17 SDGs. The descriptions serve as background information for those readers less familiar with the actual content of the SDGs. The content of this appendix comes from the United Nation's website and has been paraphrased for the purpose of increased readability (United Nations, 2015).

The first goal mentioned is *no poverty*. According to the United Nations Educational, Scientific and Cultural Organization (UNESCO), there are currently living a staggering 836 million people in extreme poverty[8]. The overwhelming majority of those living on less than $1.25 per day can be found in the sub-Saharan Africa and Southern Asia regions.

The second goal, *zero hunger*, aims to *''end hunger, achieve food security and improved nutrition and promote sustainable agriculture''*. The UN indicate that currently a total of 795 million people is undernourished worldwide. Poor nutrition is linked to almost half of all child deaths under five and early medical conditions such as stunted growth. The solution space for the second SDG is focused on bringing innovation to agriculture in the poorest parts of the world, as small-scale farms in these regions satisfy up to 80% of the food demand in the developing world.

SDGs are commonly interrelated and the third goal, *good health*, is no exception. Even though more progress is still to be made, improvements in nutrition have greatly reduced child infant mortality as well as maternal death in the world's poorest regions. Diseases such as malaria have become less frequently lethal thanks to e.g. vaccines, affordable antiretroviral treatment and family planning initiatives. However, citizens of the world's most developed countries deal with health issues that are preventable, such as obesity and heart disease, which are addressed through SDG number three.

Still not every child has access to primary education and worldwide an estimated 103 million people roaming the earth are illiterate. The fourth SDG, *quality education*, addresses this issue through ensuring for example free, equitable and quality primary and secondary education for both boys and girls by 2030. Through investing in both educators as well as education infrastructure and scholarships available to students from developing countries, the UN attempts to accomplish the fourth SDG.

Gender equality is the fifth issue addressed by the sustainable development goals. In the developing world, especially in sub-Saharan Africa, Western Asia and Oceania, girls face more obstacles in entering primary and secondary education. However, the gender inequality issue is not reserved exclusively for developing nations; Developed countries across the planet struggle with gender inequality issues such as the gender pay gap.

''2.6 billion people have gained access to improved drinking water sources since 1990, but 663 million people are still without.'' The sixth SDG aims to improve the drinking water facilities of those around

[8] UNESCO classifies those people earning less than $1 per day as extremely poor.

the who either lack access to drinking water, or of those whose drinking water sources are below a certain quality threshold. Closely related to goal number three, *good health*, access to affordable clean water and sanitation should be a universal right for al by 2030.

Carbon emissions induced climate change is one of the largest issues mankind will battle in the upcoming decades. Goal number seven, *affordable and clean energy*, aims to reduce the carbon-intensity of the world's current energy mix. Moreover, developing nations currently highly dependent on wood or animal waste as a heat source should have access to affordable (clean) energy by 2030.

In many places throughout the world, having a job does not necessarily result in a path towards a comfortable life, outside the grasp of poverty. Unemployment has been on the rise during the past decade and with so many around the world living on less than US$2 per day, sustainable economic growth is necessary to provide decent work for all. Financial institution will play a major role in the eighth SDG, *good jobs and economic growth*, by providing insurance, banking and financial services.

The ninth sustainable development goal, *industry, innovation and infrastructure*, is related to goal number eight and stresses the important of (responsible) investments in these areas to realize sustainable development. Access to electricity is restricted for at about 2.6 billion people worldwide, reliable phone services are not available to over one billion people on earth access to water and sanitation, as mentioned in previous SDGs, can improved greatly. Doing so, productivity of labor and capital can be greatly improved, thereby positively impacting *social, economic and political goals*.

All parts of the globe are dealing with problems, but the burden is unequally distributed. Income inequality between the world's developed and developing countries is still on the rise, resulting in a vicious cycle depressing growth and poverty alleviation in the developing world. Sustainable development goal 10, *reduced inequalities*, attempts to "*promote the social, economic and political inclusion of all, irrespective of age, sex, disability, race, ethnicity, origin, religion or economic or other status''*.

Half of all humans today and 60% of all humans in 2030 are living in cities. Seeking employment and better living conditions, a massive urbanization has taken place throughout recent decades. However, with 826 million citizens currently living in slums, cities need to be prepared for a future capable of handling the numbers. Goal eleven, *sustainable cities and communities*, addresses this issue, acknowledging the great potential of cities for efficient usage of resources and energy consumption through technological innovation.

There is only one planet Earth. Currently, however, we are using its resources faster than the Earth can replenish itself. This of course is unquestionably a major threat to future generations. With the prospect of decreasing poverty and therefore increasing consumption, as well as a growing global population, this threat only increases in the *business as usual* scenario. The twelfth SDG, *responsible consumption and production*, targets this issue. Stimulating the adoption of a circular economy, the UN aims reduce losses in the food, water and energy sectors. Ultimately, sustainable usage of the Earth's resources will allow for high standards of living for all, without compromising the ability of future generation to provide in their own needs.

Perhaps the largest issue facing humanity today, climate change comes in several different forms and poses a threat to people from every continent. Floods, droughts, hurricanes and other forms of extreme weather conditions may occur more frequently than usual, longer than usual and be more

intense. The Paris Agreement, which was adopted in December 2015, targets to limit the global rise in temperature well below 2°C, the threshold assumed to be the absolute maximum for humankind to continue to prosper on planet Earth. Goal number thirteen, *Climate Action*, aims to make sure that the Paris Agreement and its targets are honored.

The fourteenth goal, *Oceans*, takes us back to the origins of man. For much of the resources worldwide, humans depend on the oceans. Over three billion people rely on the oceans as their primary source for protein, which consequentially (in)directly employs hundreds of millions of people. Ultimately, the seas also play a pivotal role in the global climate, as well as in the atmospheric balance of oxygen and carbon dioxide. Therefore, failing to carefully manage our oceans poses a threat to future generations, as well as to vulnerable people living today.

Another main source of resources worldwide are the Earth's forests. Covering over 30% of all land on Earth, forests play an invaluable role in replenishing atmospheric oxygen levels and fighting climate change. Moreover, these pristine regions of Earth are home to countless of terrestrial species, be it flora or fauna. Goal fifteen, *life on land*, plays a crucial role in combating desertification and halting both land degradation and the loss of biodiversity.

If the world is to successfully implement the sustainable development goals, everyone will need to pull in the same direction. Therefore, goal sixteen, *peace, justice and strong institutions*, promotes a peaceful and inclusive society. Goal 16 targets mostly corruption, violence and the exploitation, abuse and trafficking of persons and children in specific. Through establishing effective and transparent institutions, decision-making will become more inclusive, responsive and participatory. The transparency principles will mean that public can exercise control through open access to information.

The transformation suggested by the sustainable development goals is truly a multi trillion-dollar project. Obviously, no man, company, institution or government will be able to handle it alone. Therefore, the last of the seventeen sustainable development goals, *partnerships*, aims at mobilizing massive amounts of public and private resources towards sustainable development projects all around the world by means of creating partnerships between governments, the private sector and civil society. Through *''monitoring frameworks, regulations and incentive structures''*, investments in critical sector such as *''sustainable energy, infrastructure and transport, as well as information and communications technologies''* will be realized.

Appendix II – Interview Protocol

The second appendix shows the interview protocol as how it was presented in advance to the nine interviewees. The goal of the interviews was to support the literature review on sustainability in the financial sector, as well as determining the system requirements and specifications for the design of the tool proposed in this thesis.

Matthijs Henseler
4514661
MSc. Engineering and Policy Analysis
TU Delft – Technology, Policy and Management

Thesis:
Sustainability through Finance: Using the SDGs to gauge Financial Institutions' indirect Environmental Impact

Date	
Time	
Duration	
Interviewee	
Company	
Role	

Introduction

As a student at the TU Delft, studying the MSc. Engineering and Policy Analysis, I am currently conducting my graduation project. In alignment with my internship at the Global Alliance for Banking on Values (GABV), my research focuses on devising a system capable of measuring a financial institution's (FI) indirect impact on environmental sustainability. In order to assess this impact, I will be using the UN's Sustainable Development Goals to operationalize environmental sustainability. The scope of my research only considers a FI's indirect impact on environmental sustainability, i.e. through their lending and investment portfolios.

So far, no commonly accepted methodology exists that measures a FI's impact on environmental sustainability through the UN's SDGs. It will be essential to include a multi-actor approach in the design of this system for it to be concise enough to be accepted, while at the same time thorough enough to be useful. Therefore, I have asked you for this interview, as I hope that your experience in the field of finance can shine light on the limitations and virtues of the different tools currently used to assess sustainability in the financial sector, as well as your view on sustainability in the financial sector in general. Moreover, I would like to hear about your experience with the SDGs in the financial sector.

I. Is interviewee OK with being recorded?
II. Is interviewee OK with being quoted in my thesis work?
III. Speaking on behalf of company or own person?

Questions

Topic 1 – A general introduction

1. How would you best describe your role within your company?
2. What role does sustainability play within the company as a whole?

Topic 2 – Sustainability in the Financial Sector

3. Could you say that you are seeing a shift in the financial sector's attitude towards sustainability? [**if not mentioned**, ask specifically about environmental sustainability]
4. How far do you believe a financial institution's responsibility to environmental sustainability goes? [**if necessary**, ask specifically about prioritizing indirect environmental sustainability; minimizing negative impacts through lending and investment decisions]
5. What do you think can stimulate the financial sector to adopt sustainable business practices faster?

Topic 3 – Sustainability assessment methodologies in the financial sector

6. How do you currently assess sustainability in the financial sector? [**logical follow-up**, *why* this particular method?]
7. What are the virtues of this assessment methodology?
8. What are the limitations of this assessment methodology?
9. How do you differentiate between quantitative and qualitative factors and is one more important than the other?

Topic 4 – Sustainable Development Goals in the Financial Sector

10. What role do the SDGs play within your company?
11. What role do you foresee for the SDGs in financial sector?
12. Do you believe that an (environmental) assessment methodology based on the SDGs would be valuable, why? [**if answered positively**, ask what would make such a methodology successful from a user's perspective?]

Top 5 – Sustainability assessment methodologies for the financial sector in general

13. What do you think are the three most important characteristics of a sustainability assessment method designed for financial institutions in general?

Closing

- Ask whether or not the interviewee would like to **share** thoughts on topics that were not discussed during the interview
- Ask whether or not the interviewee would like to **stress** certain answers that were given during the interview
- Explain that the interviewee will receive an interview report which can only be used for my thesis after the interviewee has approved of it

Appendix III – Interview Reports

All interviews have been summarized in interview reports. The interview reports have been sent back (upon request) to the interviewees so they could review the content, and were given the opportunity to rephrase any answers in case the interview report did not reflect their views properly. Given the open structure of the interview and the different background of the interviewees, not every interview report contains all questions from the protocol. Moreover, where appropriate additional information was requested from the interviewee, which might also not reflect any question in the protocol.

01_InterviewThesis_RoslVeltmeijer_MatthijsHenseler

Date	20-4-2017
Time	10:00
Duration	55 minutes
Interviewee	Rosl Veltmeijer
Company	Triodos Investment Manager
Role	Head of Sustainability Research

Topic 1 – A general introduction

1. **How would you best describe your role within your company?**

Rosl Veltmeijer's function within Triodos Investment Management is to translate the values of the Triodos Bank into sustainability policy for investing in the financial markets. This sounds easier than it actually is; Triodos IM knows very well in what sectors they want to invest their money (e.g. sustainable agriculture, renewable energy, healthcare), but there are not many companies who specialize in these areas specifically. So, it is important to find those companies who perform best in these sectors in terms of sustainability. The key is then to establish criteria in order to determine which companies are best-in-class. Finding the rights balance between criteria and establishing a proper sustainability-threshold are extremely important tasks in Veltmeijer's job.

2. **What role does sustainability play within the company as a whole?**

Triodos IM operates according to the same values as the Triodos Bank. This means that the areas financed by Triodos Bank are similar to the areas targeted through the investment funds set up by Triodos IM (e.g. renewable energy fund, microfinancing fund). Hence, activities of both entities (Triodos Bank and Triodos IM) are aimed to support sustainable human development. However, the means by

which Triodos IM supports this goal are different from Triodos Bank's means; Triodos IM invests their money on the financial markets.

*It is important for Triodos IM to specifically state the areas where they **do** want to put their money to work, rather than only stating the areas where they **don't** want to put their money to work (i.e. positive screening rather than negative screening). However, when investing money on the financial markets, negative screening remains important as Triodos IM maintains a certain sustainability threshold as well. This sustainability threshold is not often relevant, as Triodos will never receive financing requests from for example a weapon manufacturer. However, it is important to maintain the sustainability threshold in order to guarantee consistency throughout the organization (as an example: if a producer of sustainable cotton seeks financing, this cotton obviously should not be picked by child-laborers). Rosl Veltmeijer continues by stating that half of all companies that were selected through positive screening, do not receive financing as they don't pass the negative screening test (the sustainability threshold).*

In order to obtain information on all these large enterprises, Triodos IM uses sustainability research from Sustainalytics, which also includes opinions of NGOs that monitor the operational sustainability of large multinationals. All this information is combined into a company's sustainability profile sketch, which is very important for the assessments conducted by Triodos IM. This research from an external party is especially important for Triodos IM's best-in-class screening method (i.e. to decide whether a company like Phillips qualifies to be financed by Triodos, information on all other large companies (MSCI World Index companies) in the same sector is required). Gathering information on the entire sector would be too time-consuming for Triodos IM to conduct themselves.

The Triodos sustainability values are used as a 'layer' on top of the information purchased from third parties. This still requires a lot of effort considering the high standards of Triodos when it comes to sustainability; and this is also where Triodos IM distinguishes itself from other asset managers, as they have gained a lot of experience over the years in these practices. Moreover, the basket of 280 companies that Triodos IM invests in does not change regularly, meaning that Triodos IM knows the companies very well and knows what to look for in these companies when considering sustainability related issues.

2.1 After having invested in a company, does Triodos IM still try to influence sustainable conduct of that company?

Yes. Engagement is very important for Triodos IM, they already invest in the front-runners of a sector when it comes to sustainability, but they believe that a company can always improve and we try to assist them in this process. However, Triodos IM does not engage with a company in terms of strategy, this topic is left to the managers and directors. As an example, Veltmeijer refers to their engagement

with a wind-turbine manufacturer (Nordex) who could improve on their supply chain in terms of sustainability (conflict minerals). They engaged with Nordex as equal business partners (having a constructive dialogue rather than judge) and pointed out the possibility of conflict minerals in Nordex's supply chain. Six months later Triodos IM contacted Nordex again to review the topic of conflict minerals, with the result of Nordex having taken responsibility for their supply chain.

Through owning stocks in a company, Triodos IM also has the right to vote on the Annual General Meetings (AGM) of a company. This means that if according to Triodos IM a board of directors needs a change (e.g. there are not enough women in the board of directors, or the directors have been seated in the board for too long or have to many activities), they can voice their concerns through voting in a certain direction during the AGM. To make sure that their votes do not simply disappear in among the masses of other votes, Triodos IM always announce their votes in advance to the company and also supports their voting behavior in written text (allowing the company to respond to their voting behavior as well). Triodos IM also is quite unique in the sense that they publicly announce all their votes via their website.

However, Triodos IM only engages with companies that they already invested in, meaning that these companies have already passed the sustainability assessment. Veltmeijer continues to explain that this means Triodos IM will not engage with a large Oil & Gas company in order to make them change their behavior. Hence, shareholder activism is not found within Triodos IM's toolset for engagement.

Topic 2 – Sustainability in the Financial Sector

3. **Could you say that you are seeing a shift in the financial sector's attitude towards sustainability? [*if not mentioned*, ask specifically about environmental sustainability]**

Rosl Veltmeijer definitely sees progress in the financial sector's attitude towards sustainability. On the other hand, however, an assets manger like Triodos IM is extremely small compared to other players in the financial market (such as ING for the Dutch market). Veltmeijer is much impressed by all the policy ING has developed over the years when it comes to sustainability issues. However, she also acknowledges that there are still many loopholes in these policies (e.g. the re-financing of large projects). Veltmeijer also acknowledges how extremely difficult it would be for a company the size of ING to incorporate newly developed sustainability policies throughout all their activities around the globe. As an example of the financial sector's progress, Rosl Veltmeijer mentions the pressure that has led ING selling their share in the controversial Dakota Access Pipeline.

Furthermore, Rosl Veltmeijer states that it is difficult to see this issue separate from the political arena. Unlike a small financial institution such as Triodos, ING has the 'responsibility' to finance the Dutch economy. Given the fact that the Dutch government issues permits for the construction of coal-fired power plants, rather than renewable energy facilities, to what extent can you blame the financial sector for financing these projects? Besides, considering the fact that ING finances roughly 20% renewable energy and 80% Oil & Gas assets, they clearly outperform the Dutch government who are stuck around 5% renewable energy production.

Another way in which Triodos IM looks at the financial sector is not necessarily the sustainability of their portfolios, but rather the connection of these portfolios with the real economy (i.e. to what extent does a financial institution finance direct economic activity generating goods and services, rather than exclusively concerning themselves with the financial markets)

4. How far do you believe a financial institution's responsibility to environmental sustainability goes? [**if necessary**, ask specifically about prioritizing indirect environmental sustainability; minimizing negative impacts through lending and investment decisions]

Rosl Veltmeijer sees a complex dilemma in this question. On the one hand, she thinks that a financial institute should clearly developed policies for themselves, in which they state what activities they are willing to finance, and where they draw the line of not financing a company anymore. On the other hand, Veltmeijer argues that the financial sector should be steered in a sustainable direction by the government; if it's not ING, Rabobank or another large bank financing non-sustainable practices, another financial institution will seize the opportunity to invest.

Veltmeijer acknowledges the 'luxury' position of Triodos IM, who only has the responsibility towards themselves and their investors, as opposed to for example ING, who are also burdened by the responsibility of financing the Dutch economy (which is closely linked to the Dutch government of course). Hence, it is more difficult for larger financial institutions to become truly sustainable. However, there are of course still actions that such financial institutions can take in order to move in a more sustainable direction. They could easily stimulate clients to become more sustainable, for example through giving a discount on the part of a mortgage that is used for improving the energy efficiency of a home or office.

Rosl Veltmeijer acknowledges that the real impact of a financial institution on sustainability related topics is through their financial activities resulting in the composition of for example their lending and

investment portfolios, as opposed to the direct footprint of a financial institution itself (what I refer to as the indirect impact, rather than the direct impact).

5. What do you think can stimulate the financial sector to adopt sustainable business practices faster?

Veltmeijer mentions the option of offering tax incentives to civilians through the banks (referring to the ''Groenfonds''). Furthermore, she believes that the current system should be turned around; Sustainability should be the norm, and any deviation from the norm (e.g. pollution or social exclusion) should be punished through taxation. This also means that the price of a product or service should include all the costs of non-sustainable practices. As an example, she mentions organic [agricultural] products, which should be cheaper than non-organic products as the latter inflicts more long-term damage on the soil, making it more expensive in the long-term.

The responsibility to address this issue lies with every actor in society, but surely it also lies with the politicians, as they influence pricing for example through subsidies. However, in order to alter the underlying price-mechanism, an effort is necessary from 'everyone' – private sector, citizens, politics etc. An issue of course that won't be solved in the near future.

5.1 So you believe a top-down approach (from political perspective) is more appropriate to achieve this goal than a bottom-up approach (from citizen movements)?

Rosl Veltmeijer states that as citizens, we could also do much more of course. A company such as Apple, who barely pay any taxes, should not receive this much support from consumers, yet everyone wants the new iPhone. If all citizens start demanding structural changes from Apple, surely, they will start adopting to the consumer's whishes within no time. However, the consumer does not seem to easily alter their consumption patterns.

[Moving on to a different yet equally relevant topic]

Veltmeijer states that it is not necessarily just Apple and Starbucks that fail to contribute their fair share to society in the form taxes. However, since they are such large brands, their failures in terms of sustainability are more quickly exposed. Veltmeijer does not believe that it is only large consumer facing MNCs who conduct wrongdoings in terms of sustainability, but that we simply don't know it from other large companies as they are not equally often called out on it.

As an example, she refers to Nike and Adidas. Nike encounters more often controversies regarding their supply chain than Adidas, even though if you were to carefully map both supply chains, you will largely come across the same suppliers. The fact that Nike gets confronted with sustainability related issues in their supply can largely be explained by NGOs who focus on the bigger brands, as that results in bigger newspaper headlines.

For Triodos IM, however, it is important to remain objective when assessing both companies. They do this through carefully assessing both companies when it comes whether or not they have a policy regarding for example human rights in place, how they bring this policy into effect, how they report on this policy and what targets they set for their policy. The companies are then compared on this level. Reflecting back to the case of Adidas and Nike; if Adidas would less frequently be called out on controversies in their supply chain, but they don't have any clear policies on these issues in place, they would less quickly qualify for an investment from Triodos IM than Nike, who might have more controversies surrounding their supply chain, but do have clear policies in place on discovering, reporting on and improving the issues.

Topic 3 – Sustainability assessment methodologies in the financial sector

6. How do you currently assess sustainability in the financial sector? [**logical follow-up**, *why* this particular method?]

At Triodos IM they use two different assessment methodologies: best-in-class and pioneer. Pioneer companies are companies for which they look at their products and services; if a company obtains more than half of their revenues from products and services that are truly sustainable, a company is a pioneer in the eyes of Triodos IM. These companies may come from anywhere. There are roughly 45,000 listed companies, and together with the asset manager the best performing companies are selected (cherry-picking). Following this method, Triodos IM has created their Pioneer Fund.

There are also three of Triodos IM's funds based on their best-in-class method. The starting point for this method is the MSCI world index, listing the 1850 largest companies. Thereafter they look at all companies on this list within a specific sector. Based on information purchased from Sustainalytics and their own criteria, Triodos IM ranks all companies in that specific sector. The 50% best performing companies are then allegeable for an investment from Triodos IM.

The criterium for investment is thus that a company performs better than its peers. Their sustainability performance is in that sense not represented by any absolute figure, but is only in relation to its peers. Hence, even in a very badly performing sector (in terms of sustainability) some companies will perform better than others, making them best-in-class. Triodos IM chooses these companies not because they

are per definition sustainable, but because they raise the 'sustainability-bar' for other companies in their sector. After the best performing 50% has been selected, the asset manager selects those companies that fit best with their portfolio.

However, note that in any case the 'sustainability threshold' is applied, meaning that in certain sectors not one best-in-class company can be found (such as mining and Oil & Gas).

For both assessment methodologies, every company is reviewed every three years, to make sure they still generate 50% of all revenues from sustainable products and services, or that they are still within the 50% best performing companies in terms of sustainability in a sector. Also, they are again screened against the sustainability threshold criteria. Considering the thorough assessment and that not many large shifts occur in three years, in practice there are rarely any major issues to be identified in these companies.

7. What are the limitations of this assessment methodology?

The numbers do not always tell the complete story. Sometimes very average performing companies can be among best-in-class performance, even though realistically it would be difficult to classify that company as being sustainable, or at least a company working to become sustainable.

Also, for the financial sector Rosl Veltmeijer does not believe the methodologies to be very effective. Mostly this is the case because the best-in-class method would reflect on information on the direct sustainability practices of a financial institutions, rather than its indirect sustainability. Triodos IM would be much more interested in knowing what a financial institution does with their money, i.e. impact through their portfolios, rather than e.g. the direct environmental impact of their offices etc.

Topic 4 – Sustainable Development Goals in the Financial Sector

8. What role do the SDGs play within your company?

The role of the SDGs within Triodos IM forms a bit of a struggle. At the moment, everyone is greatly involved with the SDGs (which is in principle a good thing). And at Triodos, we also link our own sustainability policies to the SDGs (e.g. in Annual Report). However, at Triodos there already exists such an elaborated and clear view on sustainability, that the SDGs not necessarily contribute to this: ''At Triodos we already have our own SDGs''. Triodos will continue to link their own principles to the SDGs as long as there is a need for this, but SDGs will not soon form the basis of Triodos' principles.

9. What role do you foresee for the SDGs in financial sector?

SDGs are certainly not a hype. As an example, Rosl Veltmeijer mentions RELX (Reed Elsevier), who have recently published their sustainability report which they completely configured on the SDGs. Through the SDGs, RELX is now much more able to assess how their core business activity impacts sustainability. The SDGs is in that sense enable a shift in the behavior of companies.

For the financial sector in general (so not Triodos specifically), the SDGs can fulfil a similar role (i.e. making a financial institution aware of its sustainability impact an enable communication on this subject).

10. Do you believe that an (environmental) assessment methodology based on the SDGs would be valuable, why? [**if answered positively**, ask what would make such a methodology successful from a user's perspective?]

Considering the complexity of the SDGs, it remains very difficult to systemically assess sustainability based on the SDG criteria. The SDG operators are very much interlinked, meaning that by altering the values for operator, you automatically impact other operators and thus other SDGs as well. This makes it very difficult to isolate a specific issue and work it separately. Also, it remains unclear for Veltmeijer how the final scoring of a methodology founded upon the SDG criteria will happen.

Top 5 – Sustainability assessment methodologies for the financial sector in general

11. What do you think are the three most important characteristics of a sustainability assessment method designed for financial institutions in general?

- *Simplicity*
- *Consistency*
- *Efficiency*

02_InterviewThesis_Gert-JanSikking_MatthijsHenseler

Date	25-4-2017
Time	09:00
Interviewee	Gert-Jan Sikking
Company	PGGM
Role	Senior Advisor Responsible Investment
Interviewer	Matthijs Henseler

Topic 1 – A general introduction

1. How would you best describe your role within your company?

PGGM is a pension provider (different from a pension fund) that manages sectoral pension funds. PGGM conducts three main activities: (1) Pension administration, (2) Asset management and (3) Policy consultancy. Currently PGGM employs around 1150 people in Zeist, and the biggest client is the pension 'Zorg en Welzijn'.

*Within the branch of asset management there are several investment teams working who operate on a global scale throughout several categories. Additionally, there is a 'responsible investment' team within PGGM where Mr. Sikking is operational. The responsible investment team supports the investment teams in order to map the Environmental, Social and Governance (ESG) risks. On the one hand, this means that the responsible investment team determines which investments are excluded from the portfolio (e.g. certain weapons, tobacco). On the other hand, the team engages with investees through the shares they hold in order to stimulate positive activities (*www.pggm.nl/beleggeninoplossingen*). If improvement through engagement is not achievable, the responsible investment team has the possibility to advise a reduction of the respective shares in the portfolio, or even complete withdrawal.*

2. What role does sustainability play within the company as a whole?

Through their 'investing in solutions' (beleggen in oplossingen) approach, PGGM mostly focuses creating in impact on four specific areas: (1) Climate, (2) Water, (3) Food security and (4) Healthcare. It is important for PGGM to also measure and report on their impact in these four areas. These four themes have been established three years ago (ahead of the SDGs) and the goals are set for the year 2020. When the measurements started in 2013, PGGM had roughly €5bln. invested in assets related to these four areas, the ambition is to increase this amount to €20bln. in 2020.

Considering the impact of SDGs as a communication tool, currently PGGM works on mapping the SDGs, making it possible to link their impact in these four areas to correlating parts of the SDGs. Considering the novelty of the SDGs and the fact the PGGM has already established four impact areas for themselves, SDGs do not form the foundation for their criteria. Hence, in the context of sustainability at PGGM the SDGs are used more as a communication tool. However, Mr. Sikking acknowledges that enabling 'SDG investing' through relating certain investment categories to SDGs could be a next step in their sector. Already PGGM has

For now, PGGM measures their impact in all investment categories. Measuring the impact is certainly difficult and the process not yet perfect, but PGGM aims to improve these efforts every year. Reports on these measurements are also made and published on PGGM's website. With improving data and more standardization, it could become possible to establish specific impact targets for the invested amounts. Through their measurements, PGGM is able to discover where they can have the most impact. This could allow them in the future to offer clients advice on how to achieve impact on specific themes most efficiently.

Topic 2 – Sustainability in the Financial Sector

3. Could you say that you are seeing a shift in the financial sector's attitude towards sustainability? [**if not mentioned**, ask specifically about environmental sustainability]

Mr. Sikking [positively] states that more and more thought is given to sustainability matters in the financial sector these days. PGGM has decided a few years ago, together with their clients, that they support a shift towards sustainability focused investing. The support of the clients is pivotal, as it legitimizes their sustainable focus. Together with clients, but also other actors within the same sector PGGM goes through a learning curve. Mr. Sikking stresses the importance of going through the learning curve together with other companies in their sector, as it makes the global positive impact more valuable. The shift towards sustainability in the financial sector is visible through for example the increasing amount of conferences on this topic, or the increasing amount of companies reporting on sustainability targets.

With the increasing adoption of sustainability targets in pension funds in The Netherlands (e.g. PMT recently adopted sustainability targets), but also in for example Scandinavia and The United States, sustainability in the financial sector is becoming more mainstream. Where previously this mostly was the domain of 'impact investing', where the financial returns is sometimes subordinate to having an impact, the combination of both impact and financial returns now becoming more visible.

However, Mr. Sikking acknowledges that it remains difficult to apply sustainability principles throughout the entire portfolio, as the number of 'good deals' is limited.

4. How far do you believe a financial institution's responsibility to environmental sustainability goes? [**if necessary**, ask specifically about prioritizing indirect environmental sustainability; minimizing negative impacts through lending and investment decisions]

According to Mr. Sikking, the true responsibility for creating a sustainable economy lies with the 'real economy', and it is up to the government to facilitate this transition. Much of this transition depends on technology that will be developed in the future. The government can support the transition through investments aimed to kickstart the necessary technological development. As an example, many wind farms have been built with help of government subsidies, however, with technology improving through experience, wind farms are now becoming financially feasible on their own. Hence, where the balance between risk and financial return is not yet conform market standards, the government can help to bridge the gap.

The financial sector itself can finance the sustainable transition, but cannot directly contribute to this development that much on their own. PGGM aims to fulfill their part through stimulating for example electric driving or cycling among employees, organic food in the office restaurant and solar panels on the rooftops, but considering the bigger picture this remains only a small impact. The true impact of PGGM is via the €200bn. they wield on the financial markets, but this impact can only be through financing other companies' activities in the real economy. Without good sustainable projects in the real economy, it becomes very hard for PGGM to fulfill their sustainability ambitions.

Additionally, PGGM believes in improving the sustainability of the financial sector's system itself. For the system to become inherently sustainable, it should focus on more on the long-term and contribute to the real economy, and more specifically to sustainability efforts within the real economy. This matches the core activities of PGGM as a pension provider. Considering that PGGM invests for their clients with a time horizon of 40-50 years, they do not benefit from instable financial markets resulting in economic crises (e.g. 2007-2008 great financial crisis).

5. What do you think can stimulate the financial sector to adopt sustainable business practices faster?

Different developments can be observed according to Mr. Sikking. Late 2015, UNEP issued a report on the financial system showing the focus on reporting climate risks in developing countries. The Dutch

regulator DNB (De Nederlandsche Bank) has asked pensions funds, insurers and banks to map the 'climate risks' on their balance sheets in addition to traditional risks related to the financial sector (e.g. currency exchange risks). When financial institutions report on for example climate risks or financial stability risks (e.g. 'stress-test' for banks), it improves visibility of the issue. Mr. Sikking imagines that perhaps in the future other categories will be included in these risks assessment, such as investments in foods containing large amounts of sugar that form a health-threat.

Also, the focus on short-term profit maximization, which is currently still very much inherent to the financial sector (financial education, e.g. CFA exam, focuses mostly on achieving short-term financial goals), can be deterred through the regulator.

Through research from external parties, sustainability issues can become more central to the financial sector. Research on embedding the true cost of a project/product in its price could sharply alter investment decisions. For example, if the cost of CO_2 would be embedded in the price, certain investments might not seem attractive at all. For PGGM this would certainly be a good development, as their long-term focus already forces them to incorporate far-future risks into their investment decisions made today (as opposed to e.g. day trading, where long-term risks might be less important).

Topic 3 – Sustainability assessment methodologies in the financial sector

6. How do you currently assess sustainability in the financial sector? [**logical follow-up**, *why* this particular method?]

The take-off points for the negative screening conducted at PGGM find their origin in the law. This translate into for example human right policy. Together with clients PGGM has also made agreements on what type of weapons should never be used, also not in times of war, and should thus not be financed by PGGM. Moreover, Mr. Sikking stresses the importance of developing policies that are aligned to the clients. For example, considering that PGGM's largest client is the pension fund 'Zorg en Welzijn' (Dutch pension fund for the care and welfare sector), PGGM excludes all tobacco companies from their investments. Subsequently, PGGM establishes certain criteria around the ESG principles.

When a current investee does comply with PGGM's criteria constructed around the ESG principles, PGGM engages with the company. This can be done through voting during the Annual General Meetings (AGM), sending letters to the boards of directors or opening a constructive dialogue (sometimes in cooperation with other parties in order to strengthen the message).

With regard to 'Environment' criteria, Mr. Sikking refers to PGGM's real estate portfolio. In this context, PGGM measures on an annual basis for example the energy usage, CO_2 emissions and water usage of a building. Their policy is developed to give preference to more sustainable buildings. An added benefit

is that sustainable buildings have been proven to generate more returns, making it a good investment from a financial point of view as well.

To obtain all these data, PGGM uses third party information. GRESB (co-founded by PGGM) supplies information on ESG performance of real estate assets. Before PGGM decides to invest in real estate, the affiliated parties must agree to supply these ESG data to GRESB. Every investment proposal comes with a sustainability paragraph built upon the ESG principles.

7. What are the limitations of this assessment methodology?

For example, when it comes to engagement, Mr. Sikking acknowledges that it is not a very powerful tool, as the engaged party still makes their own decisions. The question from PGGM's point of view is then to keep engaging the same party and try to influence their course, or to divest. To strengthen PGGM's position, they collaborate on governance aspects together with other parties (e.g. through platform Eumedion and PRI). For example, PGGM engages with Shell on sustainability topics together with other parties.

8. How do you differentiate between quantitative and qualitative factors and is one more important than the other?

Generally, assessment start in a qualitative manner, which is then supported through quantification. However, data is not always easily obtainable, making it difficult to quantify the contribution of an investment to sustainability targets. On the other hand, collecting data and the quantification of impact is becoming more and more important and will continue to improve in the upcoming 10 to 20 years, a development to which PGGM aims to contribute.

Topic 4 – Sustainable Development Goals in the Financial Sector

9. What role do the SDGs play within your company?

The SDGs mostly come into play when considering positive screening conducted by PGGM. Firstly, when incorporating SDGs in the policy of a large pension provider such as PGGM, it is important that the respective goals of the SDGs matches those of the investor. A concrete example: For PGGM it is a rule of thumb that when investments in a certain area are made, that area should have the potential to grow to at least 3% of the total portfolio. When looking at microfinance (corresponding to the inclusive finance SDG), it would already be a challenge to invest €100mln., let alone €6bln. (roughly corresponds to 3% of PGGM's total portfolio).

Other SDGs correspond to a thriving judicial system, or gender equality. Mr. Sikking stresses that these subjects are also important for PGGM, however, he also acknowledges that it is very difficult for an institutional investor to directly invest money into related areas. These areas are more easily to include in the negative screening conducted by PGGM, but are difficult to intentionally direct money towards.

10. What role do you foresee for the SDGs in financial sector?

Mr. Sikking states that the SDGs have gained traction in the financial sector very rapidly, more than was anticipated in advance, due to great marketing. Mr. Sikking also sees trends coming together, such as ESG investing and consumer movements (led by the younger generation) who demand a form of responsible investment. The SDGs successfully combine these trends as an effective method for communicating the same message. Naturally, when more parties get involved and momentum is build up, this generates enthusiasm among even more parties to get involved ('flywheel effect').

11. Do you believe that an (environmental) assessment methodology based on the SDGs would be valuable, why? [**if answered positively**, ask what would make such a methodology successful from a user's perspective?]

It is a combination. PGGM has already committed themselves to the four themes (as mentioned previously), the SDGs have come into existence after this effort was already made. Hence, for PGGM it now makes more sense to retrospectively link the SDG to their efforts in these four themes and merely communicate through the SDGs if they see a demand for this.

On the other hand, organizations that are less advanced in terms of sustainability investing and do not (yet) report on ESG matters, can now more easily start doing so through the SDG framework, which would then form the bases the assessment methodology. For example, PMT has recently states that they want to link 10% of their investments to the SDGs by 2021.

Topic 5 – Sustainability assessment methodologies for the financial sector in general

12. What do you think are the three most important characteristics of a sustainability assessment method designed for financial institutions in general?
    - *Practical – keep is simple*
        - *PGGM reports through stating whether an investment enables (1) more of a good thing, (2) less of a bad thing or (3) access to a good thing. This allows for a clear assessment, as opposed to other tools which lose their effectiveness as they attempt to be too exhaustive.*
    - *Just start – along the way you will discover automatically discover ways to improve*
    - *Share your experience – it's not just about a competitive advantage, but about improving as a whole: share, expand your network and learn from each other.*

03_InterviewThesis_GiuliaPorino_MatthijsHenseler

Date	26-4-2017
Time	10:00
Duration	38 minutes
Interviewee	Giulia Porino
Company	Finance watch + PhD Sapienza Università di Roma
Role	Membership Coordination and Development at Finance Watch
Interviewer	Matthijs Henseler

An Introduction to Finance Watch – By Giulia Porino

Finance Watch is an independent public interest organization founded in 2011 in the aftermath of the crisis. It was created in response to the huge amount of regulation that the European Commission was sending to parliament in a post crisis response.

The mandate of Finance Watch at that point was to counterbalance the lobbying power of the financial sector. The legitimacy of Finance Watch is incredibly important to them and stems from their members; Finance Watch currently covers 12 countries where they cooperate with trade unions, cultural groups, environmental and development NGOs, think tanks etc.

Finance Watch also publishes a lot of research. In response to proposals for the financial sector coming from the European Commission, Finance Watch performs technical analyses. Besides their lobby activities on the European level, Finance Watch also lobbies in National Parliaments which strengthens their European position from the bottom up. They are active in the so-called 'lobby level 0', meaning that Finance Watch attempts to set the agenda in order to steer public debate concerning the European financial sector. A good and encouraging example of the European Commission responding to civil society concerns represented by Finance Watch is the recent creation of a high-level expert group on sustainable finance.

Over time the focus of Finance Watch has expended from a Eurocentric to a global perspective. This is necessary according to Finance Watch as the financial sector has become more and more globalized and thus interconnected; in order to achieve results inside Europe, it is important to consider other parts of the world as well. It is the goal of Finance Watch to establish financial stability through addressing

the financial system as a whole. Finance Watch tries to stimulate an open discussion regarding the system itself – stressing that the system needs to become more responsible and transparent.

Finance Watch enjoys a respected status in Europe for their technical capabilities. Regardless, a strong bias towards the status-quo is still observable. Large European banks are interested in the story told by Finance Watch, yet differences between point of views are still very much apparent.

Ms. Porino also stressed the failure of civil society in the aftermath of the crisis. When the system clearly did not function the way it should have, civil society was not ready to respond with a proposal for a new system. It is therefore important for Finance Watch to move on the mobilization of a global-level coalition, creating a movement that would be ready to respond in case of a similar event in the future.

The upcoming European election will be important for Finance to further promote their message. Upcoming September, the Global Financial Crisis will have happened ten years ago, this will mark the start of a new campaign of Finance Watch.

04_InterviewThesis_WillemvanGolsteinBrouwers_MatthijsHenseler

Date	26-4-2017
Time	15:00
Duration	60 minutes
Interviewee	Willem van Golstein Brouwers
Company	Sustainalytics
Role	Senior Advisor
Interviewer	Matthijs Henseler

Topic 1 – A general introduction

1. A general introduction of Sustainalytics

Sustainalytics is globally a leader when it comes to ESG and Corporate Governance ratings and research. Clients of Sustainalytics are investors who care to look beyond the financial information by incorporating ESG and Corporate Governance insights into the investment decisions. These activities are funded upon the believe that the global economy is to become more just and sustainable. Helping investor-clients to make more informed decisions, ultimately leading to a more just and sustainable economy, is Sustainalytics means to realize this believe.

*Sustainalytics provides ESG ratings for some 7000 companies, and roughly 12000 companies are subjected to checks regarding involvement in incidents. Information on these companies is gathered through published annual reports, websites, NGO reports (Sustainalytics keeps a record of trusted NGOs), etc. Sustainalytics keeps track of some 20000 companies so that clients can identify companies that breach, or risk breaching the United Nation's Global Compact (*http://www.sustainalytics.com/global-compact-compliance-service/*).*

Topic 2 – Sustainability in the Financial Sector

2. How far do you believe a financial institution's responsibility to environmental sustainability goes? [**if necessary**, ask specifically about prioritizing indirect environmental sustainability;

Sustainalytics is active in many different markets around the globe. Van Golstein Brouwers mentioned that the extent to which a responsibility for sustainability is felt depends on the region. As an example, Japan is mentioned, where the market expects the government to take a strong position, leading the

market (top-down). In the Netherlands, responsible investing was kick-started through a documentary (Zembla – Clusterbommen), which can be seen as a civic movement (bottom-up).

It is important that the government creates an environment in which there do not exist too many factors that inhibit the process of change. In the Netherlands for example, DNB (De Nederlandsche Bank) plays a role from the government point of view in the sense that they stimulate pension funds to include sustainability principles in their decision making. Sustainalytics as a company supports these sorts of initiatives and believe that it can be a driver for positive change.

However, when change is facilitated in a top-down manner (with the government leading the charge), there is a risk that compliance occurs simply because a company must. Sustainability then becomes an issue of ''checking boxes''. It could be more effective in case a sustainability strategy is closely aligned with a company's vision, stakeholders and expertise [which would be achieved faster through stimulating a bottom-up approach]. Finding a 'solution that fits' could create more long-term value.

Van Golstein Brouwers' personal view is that sustainable finance issues are more of a systemic nature. Any individual actor is merely a cog in the machine. In order to achieve sustainability, the system should be changed – meaning that 'all cogs in the machine' should change. As an example, Van Golstein Brouwers mentions a case study of Unilever, which was able to produce a more sustainable washing detergent. However, in order for that detergent to be successful, they needed the cooperation of washing machine producers. This makes the introduction of sustainable products all the more complicated of course. Issues of sustainability do not limit themselves to a certain sector, which makes the problem more complicated.

Topic 3 – Sustainability assessment methodologies in the financial sector

3. How do you currently assess sustainability in the financial sector? [**logical follow-up**, *why* this particular method?]

Sustainalytics composes their ESG ratings out of public sources (annual reports, sustainability reports, websites, NGO reports, investigative journalism reports, etc.). On average, out of the 7000 companies that Sustainalytics provides ESG ratings for, they systematically check 4000 companies on 70 different KPIs (out of a total of roughly 120 KPIs) within the Environmental, Social and Governance (ESG) principles. Sustainalytics then determines the weights for the KPIs and creates a thematic score (per E, S and G dimension) and an overall score.

For the remaining 3000 companies Sustainalytics provides the ratings based on a fewer amount of KPIs. The reason for this is because in the past Sustainalytics has received the request to include more

companies in their ESG ratings, but was not necessarily requested to provide the same depth on those additional company ratings.

Indicators can vary a lot in nature. A KPI can relate for example to transparency or policy, and can be expressed quantitively or qualitatively. They can benchmark KPIs on best practices (e.g. for policy related KPIs).

The ESG ratings of companies that are created by Sustainalytics are commercially exploited through sales to financial institutions. Given the popularity of Sustainalytics in their sector, the could also commercially exploit this product through advising the companies that they rate on how to achieve higher ratings. However, Sustainalytics has clearly made the choice not to start 'selling their rating'. On the other hand, Sustainalytics does provide some feedback on the ratings that they create, although this is not included in their business model in any way.

A service that Sustainalytics <u>does</u> provide is to create benchmark reports for companies that are interested to know how they perform compared to their peers. Sustainalytics does not perform any additional rating assessments for this service and only uses the information and ratings that are preexisting.

Through the KPIs, Sustainalytics also assesses the supply chains of companies.

Sustainalytics considers the indirect impact of financial institutions (impact through investment decisions) in their ESG ratings.

Topic 4 – Sustainable Development Goals in the Financial Sector

4. What role do the SDGs play within your company?

Van Golstein Brouwers confirms that since the introduction of the SDGs, they have started to receive a lot of attention throughout many different sectors. Sustainalytics was also involved with the SDG initiative (SDGi) that was created by Dutch financial sector parties and offered to the Dutch government.

Sustainalytics has done several pilot projects with specific clients, for whom they performed analyses based on the SDGs. Additionally, Sustainalytics has developed a model (soon to be released) which is a sort of framework that links the 120 KPIs mentioned earlier to the SDGs (mapping of KPIs in relation to SDGs). The goal of this is to create a view on how a company is aligned to the SDGs after a regular ESG rating has been created for said company.

The way in which Sustainalytics so far has approached the SDGs is thus more related to alignment. Van Golstein Brouwers states, however, that the SDGs itself are more about creating (and measuring) a positive impact. The problem in this regard is that there is not yet enough information available to perform very extensive analyses of many companies based on SDGs.

One thing Sustainalytics does look at, is the extent to which a company earns its revenue from activities that positively contribute to society. As an example, Van Golstein Brouwers mentions green transportation, sustainable real-estate and green energy. For these three fields Sustainalytics maps how they relate to the SDGs. In this context, the SDGs are still used as a communications framework, rather than a foundation for impact measurement.

When asked whether the SDGs in the future perhaps could fulfil the role of being a foundation for impact measurement, Van Golstein Brouwers states that the SDGs are at this moment still too much of a novelty to fulfil this role. In the future, the SDGs could become more fundamental to the strategic choices of a company. However, Van Golstein Brouwers also notes that the SDGs are very broad, which would result in those companies having to make decisions regarding to what extent the SDGs are useful for them, which would ultimately result in once again adjusted forms of the SDG framework.

Van Golstein Brouwers believes that for now the most important thing is for companies to look at their own strategies, and relate these as best as possible to the SDGs. SDGs are a very good tool to communicate a company's policies and activities. He stresses the importance that true sustainability should incorporated in the core business of a company (as an example: for a consultancy, this means that their advice should be sustainable, and not just the cars and paper they use).

Topic 5 – Sustainability assessment methodologies for the financial sector in general

5. How do you think banks can best assess sustainability in their core business?

As an example, related to SDGs, Van Golstein Brouwers mentions that banks can link their (impact) investments to the SDGs. This can also be done for the lending portfolio. Sustainalytics has a project with ING, for whom they track positive changes in their ESG ratings due to loans provided (not a direct link to SDGs though).

6. What do you think is important for a sustainability assessment method designed for financial institutions in general?

Surely the positive elements should be taken into account when assessing the sustainability of financial institutions. However, as a researcher it would also be interesting to see how the investment/lending portfolios negatively impact the sustainability criteria. This will allow for a holistic view. (→ Approach it from a positive point of view, but also account for the negatives)

05_InterviewThesis_FrancisCondon _MatthijsHenseler

Date	1-5-2017
Time	15:30
Duration	55 minutes
Interviewee	Francis Condon
Company	RobecoSAM
Role	Senior Sustainability Investing Analyst
Interviewer	Matthijs Henseler

Topic 1 – A general introduction

1. How would you best describe your role within your company?

RobecoSAM as a company is a sustainability investing specialist. RobecoSAM performs this task in the first place as an asset manager, but has also become over time a specialist on sustainable management, strengthened by the data they have gathered through their practices. The investment decisions that are taken at RobecoSAM are based in two principles: (1) It is critical for investees to include sustainable business practices in order to create long-term value for the stakeholders and (2) considering that sustainability issues result in both challenges and opportunities, it is important to integrate sustainability factors in RobecoSAM's investment process.

As a Senior Sustainability Investing Analyst, Francis Condon contributes to RobecoSAM's investment decisions through conducting sustainability assessments that allow for the aforementioned integration of sustainability factors. This process, called Corporate Sustainability Assessment (CSA), is conducted across 60 different sectors. Data for this process is acquired from 900 potential investees, which are invited by RobecoSAM to complete their Dow Jones Sustainability Index (DJSI) on an annual basis

*Additional data can be required for RobecoSAM to fulfill the CSA. This data is sourced from, for example, corruption indices, human rights risk indices, NGO reports, government reports and more. There is no set of fixed information sources – all **credible** sources are accepted in case its relevance is proven.*

From their headquarters in Zurich, RobecoSAM manages two sets of funds in Zurich: (1) The thematic set and (2) the core sustainability set. The thematic set is subdivided in five resource efficiency strategies

*based on sector, namely: (1) Sustainable **Agribusiness**, (2) Smart **Energy**, (3) Sustainable **Healthy Living**, (4) Smart **Materials** and (5) Sustainable **Water**. The investment decisions for the core sustainability set are mainly made through narrowing down RobecoSAM's investment universe based on sustainability criteria, and focuses on areas such as 'Child Impact Equities', 'Gender Equality Impact Equities' and 'Global Sustainability Equities'.*

Topic 2 – Sustainability in the Financial Sector

2. Could you say that you are seeing a shift in the financial sector's attitude towards sustainability? [**if not mentioned**, ask specifically about environmental sustainability]

Condon mentions that within the (Dutch) investment arena, the foremost driver of sustainability in the financial sector is business opportunity (market positioning). Regarding specifically to banks, Condon mentions that, aside from sustainability-niche banks such as Triodos, sustainability really is more of a 'communications game' – meaning that issues of corporate governance and risk are approached, solved and communicated from a sustainable practice point of view.

Topic 3 – Sustainability assessment methodologies in the financial sector

3. How do you currently assess sustainability in the financial sector? [**logical follow-up**, *why* this particular method?]

Vital to the sustainability assessment process are the materiality matrices that are created by RobecoSAM. Financial materiality is a term that encompasses intangible factors that can impact the core business value of a company. Examples of intangible factors that a financially materially are growth, profitability, or a company's ability to anticipate regulatory changes, etc. Sustainability factors can also be financially material. From these factors, RobecoSAM creates materiality matrices.

Data for these matrices are collected through the survey spread by RobecoSAM and filled out by some 900 companies. In this survey, 20 relevant criteria are covered, for example through asking what the key issues are for a company, or how a company is exposed. From this data, RobecoSAM determines for example whether a company does ''good or bad'', or how the company relates in these criteria compared to its peers.

4. What are the virtues of this assessment methodology?

According to Condon, a strength of RobecoSAM's assessment methodology is their in-house developed dataset. The data is collected by RobecoSAM themselves, which gives them unique insights and an advantage over competitors. RobecoSAM has been following this strategy for 16-17 years, this means that the in-house data is also very suitable for determining the direction in which companies are developing, which is essential for the long-term investment view held by RobecoSAM. As a crown on the work of RobecoSAM, they have received an A+ from the UNPRI.

5. What are the limitations of this assessment methodology?

When asked regarding the limitations of RobecoSAM's assessment methodology, Condon replies that mostly the extensiveness of the method requires a lot of work (meaning: time and resources). Moreover, as the CSA work has been going on for 16-17 years now, RobecoSAM might enjoy a respected reputation, but it also had created a lot of legacy, meaning that moving forward can be a slow process.

Topic 4 – Sustainable Development Goals in the Financial Sector

6. What role do the SDGs play within your company?

RobecoSAM has related topics reflecting company conduct (e.g. gender equality) to the Sustainable Development Goals (SDGs). According to Condon, however. It is more difficult to related the SDGs to their CSA process, i.e. linking the SDGs to RobecoSAM's products and Services. Currently, as the SDGs are still relatively novel, this is not being done to a large extent at RobecoSAM, even though they are investigating their options. One way to go about it, according to Condon, would be to link percentages of revenues of investees to certain domains of the 17 SDGs.

Relating the SDGs and sustainability in general to the supply chain of investees becomes even more challenging. RobecoSAM has become very good at rating governance performance of other companies, and rating companies relative to each other on their sustainable practices. The impact of the products created by RobecoSAM's investees is less visible, however. In order to deal with this issue, supply chain management topics reflecting issues in the life cycle are included in the survey.

06_InterviewThesis_SitaraMerchant _MatthijsHenseler

Date	2-5-2017
Time	11:00
Duration	30 minutes
Interviewee	Sitara Merchant
Company	Aga Khan Agency for Microfinance
Role	Research and Product Development Director
Interviewer	Matthijs Henseler

Topic 1 – A general introduction

1. **How would you best describe your role within your company?**

The Aga Khan Development Network consist of nine agencies, of which the Aga Khan Agency for Microfinance (AKAM) is one. The AKAM itself can be subdivided into 10 smaller institutions, which are operations controlled from Geneva and have been going on for some 10 years now. Across the globe, the AKAM has set up microfinance institutions (MFI) in Mali, Madagascar, Ivory Coast, Burkina Faso, Syria, Egypt, Pakistan, Kirgizstan, Tajikistan and Afghanistan. These MFIs are primarily funded by his highness the Aga Khan, head of the Aga Khan Development Network.

Merchant is facing a changing role within the AKAM, her task now includes overseeing the AKAM's strategical shift towards digital financial surfaces. They have developed a theory of changes, and are in the midst of creating a framework around the Sustainable Development Goals (SDGs)

2. **What role does sustainability play within the company as a whole?**

Ideally, the AKAM includes environmental factors as a core component in the financial products they offer to clients. However, access to finance for those who would otherwise not find financial inclusion is the foremost goal of the AKAM. Including environmental factors in their financial products is done for example through offering financial services for clean energy production.

Merchant uses a ladder as a metaphor for an MFI. The poorest seek help from an MFI to be financially included in the economy. Considering the constraint resources of this target group, environmental factors are difficult to include. However, when this group 'climbs the ladder' of the MFI, they may

subsequently apply for loans as an SME, at which point it also becomes easier to include environmental factors in the loan/investment criteria.

Currently, the AKAM is still in the early stages of outcomes measurement. Data for outcome measurement is collected via in-depth relation with the client, with whom contact is established at many different points throughout the relation. A client fills out a loan application and depending on his/her background may or may not require a guarantee/guarantor in order to be allegeable to receive a loan/investment. Currently, most loans applications in the microfinance sphere are for agricultural applications.

Topic 2 – Sustainability assessment methodologies in the financial sector

3. **How do you currently assess sustainability?**

Firstly, AKAM develops a theory of change. The theory of change is a theoretical causal relation between the loans that the AKAM would lend to the financially excluded, and the results they expect when a certain group of financially excluded people access finance (i.e. the question to ask is ''what do you expect to happen when you give a loan?''). Secondly, it is important to develop strong metrics to measure the outcome of the loans provided, making it possible to verify the correctness of the theory of change.

Even though Merchant could not elaborate too much on the usage of SDGs by AKAM pending an important publication on the matter from the organization themselves, she elaborated on the possible usage of SDGs to incentivize loan officers. Loan officers are very important in the strategy of composing a theory of change to assess AKAM's contribution to sustainability – It is important that the loan officer finds the appropriate clients that fit the underlying assumptions of the theory of change. The SDGs could be linked to incentivizing the loan officers, who could be rewarded extra when they find clients/projects that require funding linked to certain Sustainable Development Goals.

07_InterviewThesis_PietSprengers _MatthijsHenseler

Date	2-5-2017
Time	12:30
Duration	55 minutes
Interviewee	Piet Sprengers
Company	ASN Bank
Role	Head Sustainability Research & Policy
Interviewer	Matthijs Henseler

Topic 1 – A general introduction

1. How would you best describe your role within your company?

Piet Sprengers is head of the sustainable policy and research department at ASN. Roughly ten people work on this department, which is responsible for the development of sustainability related policies. Additionally, the department is also responsible for making sure the investment decisions made at ASN are in line with the developed policies. The crucial question is 'Which investment do we believe fit within ASN's strategy?'. As an example, Sprengers mentions that coal fired power plants do not fit this strategy, whereas windmills do fit the strategy.

ASN Bank has been founded in 1960 with the vision of banking responsibly. Several unions were involved – The idea was to create a bank with savings accounts for employees that was decent in the conventional sense (good service and interest rates), yet would not harm other workers through financing undesirable activities. Hence, sustainability has always been in the DNA of ASN, however, especially since the 1970s - 1980s, with the rise anti-apartheid and anti-weapons industry movements, sustainability has become an even greater topic for ASN.

The Brundtland report, which was published in the 1980s and introduced the term sustainable development, is still relevant for ASN. These developments have led in the 1990s to ASN incorporating 'sustainable investment criteria'.

Topic 2 – Sustainability in the Financial Sector

2. Could you say that you are seeing a shift in the financial sector's attitude towards sustainability? [**if not mentioned**, ask specifically about environmental sustainability]

Together with Triodos, ASN has an important role as market leaders in the field of sustainable finance in the Netherlands, but also within Europe. For ASN (like Triodos), enhancing sustainability is the raison d'être. Often other players within the financial sector see the market of sustainable finance as a niche market. However, Sprengers stresses the fact that for ASN this is a flawed view of the market – sustainability in the financial sector is ***not*** *just a marketing gimmick.*

Sprengers continues to state that by framing banks such as ASN and Triodos as banks operating in a niche market, other financial institutions reason that they would not have to adopt sustainable practices, as the niche is already saturated. Sprengers opposes this way of thinking, and believes that all banks should contribute to enhancing sustainability in our society, just like any other company (outside of the financial sector) should.

Sprengers refers to John Elkington, who introduced the PPP (people, planet, profit) concept. He continues by stating that in order to guarantee future profitability, you have to balance it together with the 'people' and 'planet' factors.

According Sprengers there is definitely a shift occurring within the financial sector, even though the charge is led by only a handful of players. Sprengers notices this from conversations he has with professionals working in the financial sector at other institutions. Sustainability related topics have earned a fixed place within financial institutions.

However, arguments against the implementation of far-reaching measures to promote sustainability are still often encountered. Sprengers mentions that he often hears arguments like: ''A faster transition is not feasible due to historic commitments''. Feasibility in general is an important subject in the debate to promote sustainability in the financial sector. According the Sprengers, using the 'not feasible' argument to postpone decisions regarding adopting sustainable practices equals shifting the responsibility for pressing issues over on to next generations.

Sprengers (and ASN) are in that regard among the handful of players leading the charge. A reason Sprengers mentions for other players lacking behind is because it is still too easy to externalize costs. Costs for rising sea levels, extreme droughts or other extreme weather events and costs for social unrest are all carried over to next generations because it would be considered too expensive to deal with the costs today. Feasibility is a choice. Sustainability is easily feasible, but sacrifices perhaps need to be made, such as starting to internalize costs.

3. How far do you believe a financial institution's responsibility to environmental sustainability goes? [**if necessary**, ask specifically about prioritizing indirect environmental sustainability; minimizing negative impacts through lending and investment decisions]

If a company truly wants to adopt sustainable practices, they can only do so when they start incorporating sustainability principles within the core business. For ASN, the core business are their balances (assets, loans, investments etc.). This means that for ASN (and other companies for that matter), greening their office and support electric cars among employees is not enough – Those are not the core activities.

Sprengers believes that every organization has a responsibility to contribute to the proper functioning of society. Any organization can contribute through addressing its own core activities, for a bank that means addressing sustainability through the 'balances'. Sprengers calls this the 'sphere of impact/concern'. As an example, Sprengers does not think that as a bank they should interfere with improving the education system, that is not the core activity of a bank. Stock, project finance, investments or loans <u>are</u> part of the core activity. Therefore, as an example, Sprengers mentions that as bank they can tell pharmaceutical companies to no longer sponsor doctors for prescribing their medicines, because that is within their 'sphere of impact/concern'.

4. What do you think can stimulate the financial sector to adopt sustainable business practices faster?

Stimulating sustainability in the economy is never a one-dimensional story. As an example, Sprengers refers to the ASN Bank which, even though it is relatively small, can have a certain impact itself. With 600.000 satisfied customers, ASN has proven that sustainability in the banking sector is worth caring for. Setting an example like that, is already a means by which the rest of the financial sector can be stimulated to adopt more sustainable business practices. From that perspective, the ASN bank is an example of a bottom-up movement – They do not wait for a government or regulator to make the rules, but ASN simply starts adopting measures themselves. An example of this is ASN's ambition to become CO_2 neutral in 2030, which is an initiative they started and is now followed by other institutions.

ASN Bank has developed themselves a methodology on how to measure CO_2-intensiveness of the bank's balances (bottom-up). Along the way ASN gained a lot of expertise in this failed. Their way of impacting the financial sector has been through sharing their methodology (open source) with other large players in the financial sector.

The mother organization of ASN – De Volksbank – has also adopted the same methodology and goal as ASN. Also, the regulator of Dutch banks, DNB, has been working on the development of a climate stress test that incorporates similar criteria. This is not to say that without ASN Bank it would have never happened, but it is an example of how the ASN Bank can impact the sector positively regardless of their relatively small size, via a bottom-up approach.

Topic 3 – Sustainability assessment methodologies in the financial sector

5. How do you currently assess sustainability in the financial sector? [**logical follow-up**, *why* this particular method?]

Sprengers' department has the responsibility to develop the sustainability policies of the ASN Bank. Every year parts of this policy have to be reviewed. As head of the department, Sprengers can decide what subject – e.g. human rights – is up for review. The department then develops a concept for the updated policy. This concept is then discussed during the 'sustainability deliberation (duurzaamheidsoverleg)'. All departments of the ASN Bank that may be affected by the new policy are invited participate in this process. They purely discuss the contents of the new policy – e.g. when the subject is human rights, the subject might be child labor, at which point they collectively have to decide what child labor than exactly means. Once Sprengers believes the deliberation is complete and consensus has been reached, he approaches higher management (directie), which then decides whether or not the new policies can be accepted.

The second step is executing this policy. Analysts exam the policies and decide accordingly which companies can be accepted in to the investment universe of ASN and which cannot. As an example, we considered company X. For company X to be accepted in the investment universe, they cannot be active in for example fossil fuels, make use of child labor or produce weapons. If it is discovered through analyst reports (sourced from for example Sustainalytics) that company X produces a fiber which is frequently used in the military industry to build armored vehicles, alarm bells will start going off. At this point, the analysts refer back to the sustainability policies created by the department and will check whether or not Company X is excluded from the investment universe due to the production of said fiber.

The department subsequently writes a report on company X, which then goes to the selection commission (which include members of higher management and advisors), who then decide whether or not the advice of the report will be followed. If the selection commission decides to honor the advice of the report, they instruct the investment teams that company X is from that moment onward no longer allegeable for investment.

In the case that a company is excluded from the investment universe, even though ASN Bank holds an interested in that company, they often first choose to engage with said company in order to see what has changed and why they no longer fit the criteria. However, engagement is not ASN's preferred methodology to have an impact. ASN is relatively small, hence it is unlikely that a large multinational will directly change their policy on the matter. Sometimes, the message is more powerful when an investor (ASN in the case) chooses the divest. ASN has promised its clients that their money is only used to fund sustainable practices. If ASN chooses not to divest, they would be breaking this promise.

Regarding the fossil fuel sector, ASN believes it is a dying sector, hence the choose not to invest at all. Pharmaceutical industry is a difficult subject for ASN. The pharmaceutical industry is not inherently bad – on the contrary, it can contribute to better and more comfortable lives for the clients of ASN. The system is not always 'fair' though (as an example Sprengers mentions the doctors that are being sponsored to prescribe certain medicines, at which point the doctor is not objectively acting in the interest of the patient any longer). In such a case, it might be better to not directly divest from the sector, but to collaborate with other financial institutions and engage with pharmaceutical companies so that they can be convinced to alter their behavior.

Topic 4 – Sustainable Development Goals in the Financial Sector

6. What role do the SDGs play within your company?

The Sustainable Development Goals (SDG) are in principle in line with the goals of ASN as bank. However, the SDGs are very much top-down, and it is not necessarily directly clear how a bank such as ASN should adopt the SDGs. What ASN <u>can</u> do, however, is linking the SDGs to the already existing policies of ASN. Hence, as a communication tool it can be interesting for ASN, but the policies have already been made and, for the case of ASN, are not less thoroughly developed.

For mainstream investors, perhaps the SDGs offer an opportunity and handles to think more deeply about how sustainable practices can be aligned with their strategies. For ASN, on the other hand, the SDGs do not necessarily provide new insights into the world of sustainability.

08_InterviewThesis_MartinRohner _MatthijsHenseler

Date	4-5-2015
Time	08:30
Duration	32 minutes
Interviewee	Martin Rohner
Company	Alternative Bank Schweiz
Role	CEO
Interviewer	Matthijs Henseler

Topic 1 – A general introduction

1. What role does sustainability play within the company as a whole?

Alternative Bank Schweiz (ABS) is a Swiss, ethically reflected and socially and environmentally oriented bank. It is a conventional bank in the sense that ABS offer a broad range of banking services that could be found elsewhere as well, however, ABS will always provide these services in an ethically reflected way. The key question ABS have to ask themselves is: ''What kind of world, or economy, do we want to support?''. The sustainability consideration naturally follows out of this ethical reflection of the bank. Because the sustainability considerations come forth from within, ABS are sustainable from the ground up.

Martin Rohner is the CEO of Alternative Bank Schweiz and has the final responsibility in preserving the bank's ethical codes. Previously, Rohner has been member of the board of Fairtrade International (FLO) and CEO of the Max Havelaar Foundation in Switzerland, since 2012 he heads ABS as their CEO.

Topic 2 – Sustainability in the Financial Sector

2. Could you say that you are seeing a shift in the financial sector's attitude towards sustainability? [**if not mentioned**, ask specifically about environmental sustainability]

Different from ABS, Rohner believes that sustainability/ethics is currently mostly looked upon from a business case perspective. This means that sustainability is often revered as a means to become more competitive or to mitigate long-term risks. Green-labeling of a company often still means that products

can be sold more expensively. Rohner turns this thought around for ABS – sustainability/ethics are a goal for which business (banking) is used as a means – ''it is right thing to do''.

A bank like ABS looks at the investment universe and seeks to support more companies which are active in the sustainability area, or any area where it will have a positive social or environmental impact.

3. How far do you believe a financial institution's responsibility to environmental sustainability goes? [**if necessary**, ask specifically about prioritizing indirect environmental sustainability; minimizing negative impacts through lending and investment decisions]

Every person has a mutual responsibility to support sustainability. In our capitalist economy, business decisions are primarily financially/economically driven. Banks have a slightly different situation, as they are not directly part of the real economy, but are an enabler/provider to the real economy. Therefore, Rohner argues that banks, such as ABS, have a particular responsibility in that respect.

The reality, however, is that large banks are mostly financed through the capital markets and that the capital markets are led by two dimensions only – financial risk and return. Sustainability is not a part of the decision process of the capital markets, which Rohner describes as a huge market failure. Rohner mentions no longer externalizing costs or huge regulatory intervention as potential solutions for this market failure. This would be a means for banks to become more financially sustainable as well (reducing risk of another large financial crisis).

Banks should also be made more transparent towards consumers, so that consumers can make a more deliberated decision when choosing a bank. Rohner praises the GABV Scorecard in this regard, as it precisely does that – making transparent where the depositors' money is being lend/invested.

Topic 3 – Sustainability assessment methodologies in the financial sector

4. How do you currently assess sustainability in the financial sector? [**logical follow-up**, *why* this particular method?]

Rohner states that there are two types of activities: (1) Lending and (2) Assets management. In lending, there is not a truly in-depth set of sustainability criteria and ABS good likely do better in this respect. The reasons that there is not structured set of protocols regarding sustainability in the lending part of banking activities is because historically, ABS have always been involved almost exclusively with sustainable partners, a specific set of sustainability criteria was not necessary at that point. ABS' exclusion criteria were sufficient to achieve the result.

In practice, ABS could challenge themselves a bit more in this regard. As an example, Rohner mentions the issue of 'urban sprawl' in Switzerland [Urban sprawl ... ''is criticized for causing environmental degradation, and intensifying segregation and undermining the vitality of existing urban areas'' ...][9]. Much biodiversity and important soil has been destroyed in Switzerland because the population prefers to live in low-density areas. ABS have developed a tool that measures urban sprawl, which is now an exclusion criterion for real estate. More of such measurements good be taken for managing the lending side of ABS' banking activities in a more sustainable manner.

Secondly, there is the assets management side, which can be approached in a more schematic way. There exists are very stringent set of exclusion criteria, which already reduces the potential investment universe down to roughly 120 investable companies. A typical SRI fund, on the hand, could have up to 400 investable companies. The difference, according to Rohner, is that ABS do not use a best-in-class approach to investment decisions (as an example: instead of choosing the best airline, ABS chooses to not invest in airlines at all).

The 120 investable companies left within the universe, are then analyzed according to ABS' own ESG principles. The companies are rated 1 – 5 stars. Additionally, there are also sectors which are being stimulated more than others. ABS might allocate resources more frequently towards these sectors in order to create positive momentum – a form of positive screening.

The difference between lending and asset management when it comes to sustainability screening is common throughout the financial sector according to Rohner. Many providers of ESG information exist nowadays (e.g. Sustainalytics). This sort of information does not exist for the lending market in the same quantities. Rohner continues to elaborate on the issue of this phenomenon. According to a study he has read, exclusion criteria in the asset management side might lock certain companies outside of the capital markets. These companies, however, are sometimes able to access the lending markets on even cheaper terms.

5. How do you differentiate between quantitative and qualitative factors and is one more important than the other?

ABS start with data bases composes by data supplying companies. This sort of information is always available for the larger companies and consists of both qualitative and quantitative. For smaller companies is becomes more difficult. When a company is not listed, ABS will look at whether there is at least a sustainability report and will consult the company's annual report (which is obtained through an internet research). This often means that quantitative data will more difficult to get your hand on, resulting in mostly decisions making based on qualitative data. According to Rohner (a guestimate), for roughly 80% of their investees sustainability criteria can be quantified, whereas for the other 20%

[9] https://en.wikipedia.org/wiki/Urban_sprawl

quantification of such criteria is more difficult and therefore tends to end up more 'shaky'. At this point, ABS have to resort more to common sense.

Topic 4 – Sustainable Development Goals in the Financial Sector

6. What role do the SDGs play within your company?

The sustainable development goals (SDGs) do not have a very strong role within ABS. In the past ABS have always been more of an inward-looking bank. The ethics go back to the founders of ABS, which provided clear guidelines for the bank, and there is even a special committee that oversees whether the conduct of the bank is in line with the founder principles.

The SDGs are an external framework which does not necessarily fits ABS best. This has also resulted in the SDGs to have a strong focus on development and poverty reduction. Being a relatively small Swiss bank, this makes the SDGs less relevant for a bank like ABS. Rohner argues that for this reason, the SDGs make more sense from a global perspective, rather than a small bank only active in Switzerland.

ABS have checked to what extent their current conduct is in line with the SDGs, also in order to see if they lack focus on certain areas. But given the specificity of their own ethics and the broad formulation of the SDGs, this has not been the case.

7. What role do you foresee for the SDGs in financial sector?

Rohner believes that the SDGs are helpful for conventional banks. Because it gives them a reference framework with which they can show what they do to contribute to the SDGs. However, Rohner does not foresee an increasing role for the SDGs at ABS. Rohner argues this mostly because the SDGs are formulated in a very general way – This may result in conflictive behavior (contributing to one SDG, while in conflict with another).

Appendix IV – Table of needs

The table below contains all needs that have been identified based on the interviews, sorted per interviewee. It is important to note that most of the needs and all of the interpretations are the researcher's personal interpretations, based on the content of the interview reports.

Table 10 - Table of need per interviewee

Interviewee	Organization	Needs Identified	Interpretation
Rosl Veltmeijer	Triodos Investment Management	1. Simplicity 2. Efficiency 3. Consistency 4. Objectivity *(not directly stated)*	1. A bank does not have infinite resources available. Any assessment tool should not be too much of a constraint on a financial institution in terms of its monetary or time resources. Hence, when designing a system to assess environmental sustainability of the balance-sheet assets of a financial institution, it is important that such an assessment can be completed within a reasonable amount of time. 2. Efficiency is rather self-explanatory. When time and money are invested in using any tool to complete assessments of any kind, a reasonable return (monetary or otherwise) is expected. A high efficiency of the tool guarantees an acceptable return from the invested. 3. The proposed tool will largely be of a qualitative nature. A known constraint of qualitative assessments is that the result is subjective to personal opinions etc. It is important to ensure consistency in order for subjectivity to play a minimal role in the assessment. 4. Veltmeijer has mentioned that it is important to remain objective in Triodos IM's assessments. Some companies might frequently be in the media due to scandals. However, their presence in the media might be disproportionate due to their high brand-value. It is important to remain objective when comparing these companies to their sector peers.
Gert-Jan Sikking	PGGM	1. Practicability 2. Transparency 3. Iterative	1. Practicability as mentioned by Gert-Jan Sikking is not much different from simplicity as mentioned by Rosl Veltmeijer. Mr. Sikking has recommended to keep the tool simple. As an example, Mr. Sikking has referred during the interview to their own assessment methodology where assess assets based on whether or not they (a) contribute positively to a criterion or (b) reduce a negative influence on a criterion or (c) enable access to a criterion. 2. According to Mr. Sikking it is important to share the tool openly. That would argue in favor of an open system where, for example, the formulae behind any

			calculated scores are freely shared, as well as the criteria used in the assessment. Mr. Sikking stressed the fact that openness and sharing practices would benefit the society as a whole, rather than any single player alone. 3. It is important to simply start at some point – learning by doing. The tool will never be perfect the first time it is launched and by simply just starting, automatically ways will be discovered on how the tool can be improved. This argues in favor of launching and sharing a concept system, before a detailed version of a system is finished.
Francis Condon	RobecoSAM	1. Materiality 2. Information availability	1. The criteria used in the assessment need to be the most relevant criteria that available. RobecoSAM's Francis Condon explained that at the company they use 'materiality matrices' in order to determine the criteria most relevant to measure when assessing a certain sector. They achieve this by creating a 2-by-2 matrix where potential criteria are assessed both on their likelihood of impact, as well as their degree of impact. The most relevant criteria are then selected for assessment of the respective sector. 2. Condon mentions that it is important to have the right information available for the assessments. RobecoSAM ensures the availability of this information by sending out their own surveys to over 900 potential investees. However, Condon notes that this extensive data gathering strategy is a strength of their assessment methodology, as well as a constraint as it is rather time consuming.
Sitara Merchant	Aga Khan Agency for Microfinance (AKAM)	1. Theory of change 2. Strong metrics	1. The AKAM themselves has linked their assessment methodology to a theory of change. This means that the way they assess the results of their activity is linked to the theoretical work on the causal relation between loans dispersed by the AKAM and the expected (social) benefits to those who receive the loans. That means that data collected for their assessments is specifically collected to suit their purpose, rather than textbook examples of data on loans/investment. 2. In order for the AKAM to verify their theories of change, it is important to rely on very 'strong metrics'. This argues in favor a quantitative assessment methodology with results going back several years so that causal relations can be statistically confirmed or refuted.
Piet Sprengers	ASN Bank	1. Clear 'policies' 2. Bottom-up 3. Open source	1. The assessment method of ASN Bank is founded upon clear policies designed by the department header by Piet Sprengers. The aim of these policies is to critically decide what criteria should be measured when the assessment is executed, and

			what criteria scores are desirable for a company included in the investment universe of the ASN Bank. 2. Sprengers states that at the ASN Bank they are very proud to have initiated comparable assessment project from the bottom-up. These projects, such as their goal to neutralize the CO_2 output of their balance sheets, have been copied by larger institutions after ASN Bank started it. A top-down approach is not necessarily more effective, as ultimately it would have to be adjusted per financial institutions (as is the case with the SDGs, for which the usability from ASN Bank's perspective is not directly clear). 3. Building upon the previous *need*, Sprengers stresses the fact that it is important to be selfless when it comes to the development of the proposed tool. He compares it to the ASN Bank, which is a relatively small financial institution. In order for ASN to maximize its impact, it should share its best practices with other banks, so they can freely incorporate the best practices themselves.
Martin Rohner	Alternative Bank Schweiz (ABS)	1. Simplicity *(not directly stated)* 2. Stimulate the good 3. Include the bad	1. Mr. Rohner did not directly state simplicity to be an important aspect of an assessment methodology. However, he mentioned that at ABS companies are rated on a 1-star – 5-star scale (preventing the sense of false accurateness). 2. It is important for ABS that an assessment methodology used by them highlights the companies/sector with above-average 'good' behavior, as ABS might allocate resources more frequently towards these sectors in order to create positive momentum. 3. Yet, it is also important for the assessment methodology to clearly indicate those companies/sectors performing badly. With 120 companies in their investment universe, ABS maintain a rather stringent lower threshold, holding companies up to a high standard before ABS even starts considering whether the company is an interesting investment opportunity from a financial point of view.

Appendix V – Self-interaction matrix

The fifth appendix shows the self-interaction matrix that was designed in order to assess 16 indicated needs (one need, simplicity, was mentioned double by two separate interviewees). This process is necessary as several needs show overlap with other needs; combining these needs into one category makes the subsequent steps of the system design clearer. In the self-interaction matrix, a "0" indicates that two needs have no connection and a "1" indicates that two needs have a connection strong enough to be combined in one category. The outcome of this matrix are the need categories (table 4 - section 4.1.1 – Needs).

Table 11 - Self-interaction matrix

	Number →	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**
Number ↓	**Needs ↓**																
1	Simplicity	-	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
2	Efficiency		-	0	0	1	0	0	0	0	0	0	0	0	0	0	0
3	Consistency			-	0	0	0	0	0	0	0	0	1	0	0	0	0
4	Objectivity				-	0	0	0	0	0	0	0	0	0	0	1	1
5	Practicability					-	0	0	0	0	0	0	0	0	0	0	0
6	Transparency						-	0	0	0	0	0	0	0	1	0	0
7	Iterative							-	0	0	0	0	0	1	0	0	0
8	Materiality								-	0	0	0	0	0	0	0	0
9	Data Availability									-	0	1	0	0	0	0	0
10	Theory of Change										-	0	0	0	0	0	0
11	Strong Metrics											-	0	0	0	0	0
12	Clear 'policies'												-	0	0	0	0
13	Bottom-up													-	0	0	0
14	Open source														-	0	0
15	Stimulate good															-	0
16	Include bad																-

Appendix VI – Objective tree

The purpose of this objective tree is to identify the low-level requirements based on the seven need categories. The objective is based on the objective of this thesis (section 1.3 – Research objective). Considering that the readability of this appendix might be low, results can be found in table 6 (section 4.1.1 – Requirements).

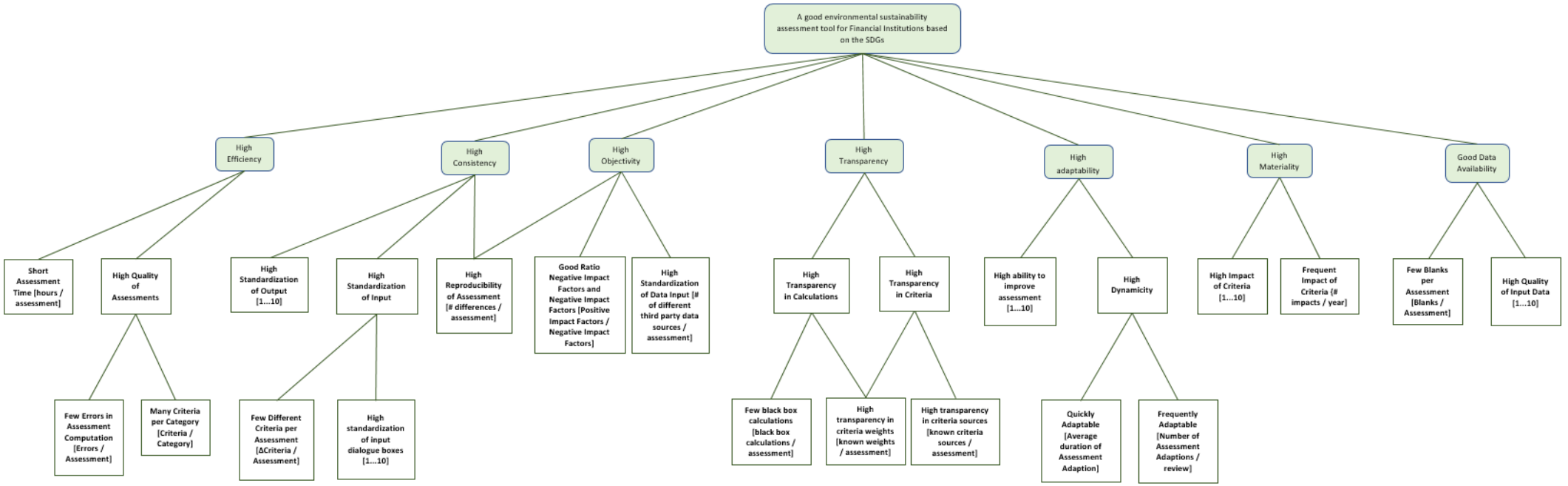

Figure 12 - Objective tree

Appendix VII – Environmental Goals, Targets and Indicators

The table presented in this appendix contains all the SDGs that were concluded to be relevant to the environment. Moreover, it includes the targets and indicators associated to each goal. This table serves as background information to figure 9 (section 4.1.2 – Claims of Positive Impact). Ultimately, 24 CoPIs were deemed 'material' and were used in the prototype tool. The ID numbers of the indicators in figure 9 correspond to the numbers in the 'Indicator' column of the table in the appendix.

Table 12 - Overview of environmental SDGs, targets and indicators

Goal	Target	Indicator
7 – Affordable and Clean Energy	7.1 By 2030, ensure universal access to affordable, reliable and modern energy services	7.1.1 Proportion of population with access to electricity
		7.1.2 Proportion of population with primary reliance on clean fuels and technology
	7.2 By 2030, increase substantially the share of renewable energy in the global energy mix	7.2.1 Renewable energy share in the total final energy consumption
	7.3 By 2030, double the global rate of improvement in energy efficiency	7.3.1 Energy intensity measured in terms of primary energy and GDP
	7.a By 2030, enhance international cooperation to facilitate access to clean energy research and technology, including renewable energy, energy efficiency and advanced and cleaner fossil-fuel technology, and promote investment in energy infrastructure and clean energy technology	7.a.1 Mobilized amount of United States dollars per year starting in 2020 accountable towards the $100 billion commitment
	7.b By 2030, expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries, in particular least developed countries, small island developing States and landlocked developing countries, in accordance with their respective programmes of support	7.b.1 Investments in energy efficiency as a percentage of GDP and the amount of foreign direct investment in financial transfer for infrastructure and technology to sustainable development services
11- Make cities and human settlements inclusive, safe, resilient and sustainable	11.1 By 2030, ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums	11.1.1 Proportion of urban population living in slums, informal settlements or inadequate housing
	11.2 By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons	11.2.1 Proportion of population that has convenient access to public transport, by sex, age and persons with disabilities
	11.3 By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries	11.3.1 Ratio of land consumption rate to population growth rate
		11.3.2 Proportion of cities with a direct participation structure of civil society in urban planning and management that operate regularly and democratically
	11.4 Strengthen efforts to protect and safeguard the world's cultural and natural heritage	11.4.1 Total expenditure (public and private) per capita spent on the preservation, protection and conservation of all cultural and natural heritage, by type of heritage (cultural, natural, mixed and World Heritage Centre designation), level of government (national, regional and local/municipal), type of expenditure (operating expenditure/investment) and type of private funding (donations in kind, private non-profit sector and sponsorship)
	11.5 By 2030, significantly reduce the number of deaths and the number of people affected and substantially decrease the direct economic losses relative to global gross domestic product	11.5.1 Number of deaths, missing persons and persons affected by disaster per 100,000 people

	caused by disasters, including water-related disasters, with a focus on protecting the poor and people in vulnerable situations	11.5.2 Direct disaster economic loss in relation to global GDP, including disaster damage to critical infrastructure and disruption of basic services
	11.6 By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management	11.6.1 Proportion of urban solid waste regularly collected and with adequate final discharge out of total urban solid waste generated, by cities
		11.6.2 Annual mean levels of fine particulate matter (e.g. PM2.5 and PM10) in cities (population weighted)
	11.7 By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities	11.7.1 Average share of the built-up area of cities that is open space for public use for all, by sex, age and persons with disabilities
		11.7.2 Proportion of persons victim of physical or sexual harassment, by sex, age, disability status and place of occurrence, in the previous 12 months
	11.a Support positive economic, social and environmental links between urban, peri-urban and rural areas by strengthening national and regional development planning	11.a.1 Proportion of population living in cities that implement urban and regional development plans integrating population projections and resource needs, by size of city
	11.b By 2020, substantially increase the number of cities and human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, resilience to disasters, and develop and implement, in line with the Sendai Framework for Disaster Risk Reduction 2015-2030, holistic disaster risk management at all levels	11.b.1 Proportion of local governments that adopt and implement local disaster risk reduction strategies in line with the Sendai Framework for Disaster Risk Reduction 2015-2030
		11.b.2 Number of countries with national and local disaster risk reduction strategies
	11.c Support least developed countries, including through financial and technical assistance, in building sustainable and resilient buildings utilizing local materials	11.c.1 Proportion of financial support to the least developed countries that is allocated to the construction and retrofitting of sustainable, resilient and resource-efficient buildings utilizing local
12 – Ensure sustainable consumption and production patterns	12.1 Implement the 10-Year Framework of Programmes on Sustainable Consumption and Production Patterns, all countries taking action, with developed countries taking the lead, taking into account the development and capabilities of developing countries	12.1.1 Number of countries with sustainable consumption and production (SCP) national action plans or SCP mainstreamed as a priority or a target into national policies
	12.2 By 2030, achieve the sustainable management and efficient use of natural resources	12.2.1 Material footprint, material footprint per capita, and material footprint per GDP
		12.2.2 Domestic material consumption, domestic material consumption per capita, and domestic material consumption per GDP
	12.3 By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses	12.3.1 Global food loss index
	12.4 By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment	12.4.1 Number of parties to international multilateral environmental agreements on hazardous waste, and other chemicals that meet their commitments and obligations in transmitting information as required by each relevant agreement
		12.4.2 Hazardous waste generated per capita and proportion of hazardous waste treated, by type of treatment
	12.5 By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse	12.5.1 National recycling rate, tons of material recycled
	12.6 Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle	12.6.1 Number of companies publishing sustainability reports
	12.7 Promote public procurement practices that are sustainable, in accordance with national policies and priorities	12.7.1 Number of countries implementing sustainable public procurement policies and action plans

	12.8 By 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature	12.8.1 Extent to which (i) global citizenship education and (ii) education for sustainable development (including climate change education) are mainstreamed in (a) national education policies; (b) curricula; (c) teacher education; and (d) student assessment
	12.a Support developing countries to strengthen their scientific and technological capacity to move towards more sustainable patterns of consumption and production	12.a.1 Amount of support to developing countries on research and development for sustainable consumption and production and environmentally sound technologies
	12.b Develop and implement tools to monitor sustainable development impacts for sustainable tourism that creates jobs and promotes local culture and products	12.b.1 Number of sustainable tourism strategies or policies and implemented action plans with agreed monitoring and evaluation tools
	12.c Rationalize inefficient fossil-fuel subsidies that encourage wasteful consumption by removing market distortions, in accordance with national circumstances, including by restructuring taxation and phasing out those harmful subsidies, where they exist, to reflect their environmental impacts, taking fully into account the specific needs and conditions of developing countries and minimizing the possible adverse impacts on their development in a manner that protects the poor and the affected communities	12.c.1 Number of fossil-fuel subsidies per unit of GDP (production and consumption) and as a proportion of total national expenditure on fossil fuels
13 – Take urgent action to combat climate change and its impacts	13.1 Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries	13.1.1 Number of countries with national and local disaster risk reduction strategies
		13.1.2 Number of deaths, missing persons and persons affected by disaster per 100,000 people
	13.2 Integrate climate change measures into national policies, strategies and planning	13.2.1 Number of countries that have communicated the establishment or operationalization of an integrated policy/strategy/plan which increases their ability to adapt to the adverse impacts of climate change, and foster climate resilience and low greenhouse gas emissions development in a manner that does not threaten food production (including a national adaptation plan, nationally determined contribution, national communication, biennial update report or other)
	13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning	13.3.1 Number of countries that have integrated mitigation, adaptation, impact reduction and early warning into primary, secondary and tertiary curricula
		13.3.2 Number of countries that have communicated the strengthening of institutional, systemic and individual capacity-building to implement adaptation, mitigation and technology transfer, and development actions
	13.a Implement the commitment undertaken by developed-country parties to the United Nations Framework Convention on Climate Change to a goal of mobilizing jointly $100 billion annually by 2020 from all sources to address the needs of developing countries in the context of meaningful mitigation actions and transparency on implementation and fully operationalize the Green Climate Fund through its capitalization as soon as possible	13.a.1 Mobilized amount of United States dollars per year starting in 2020 accountable towards the $100 billion commitment
	13.b Promote mechanisms for raising capacity for effective climate change-related planning and management in least developed countries and small island developing States, including focusing on women, youth and local and marginalized communities	13.b.1 Number of least developed countries and small island developing States that are receiving specialized support, and amount of support, including finance, technology and capacity-building, for mechanisms for raising capacities for effective climate change-related planning and management, including focusing on women, youth and local and marginalized communities

14 - Conserve and sustainably use the oceans, seas and marine resources for sustainable development	14.1 By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution	14.1.1 Index of coastal eutrophication and floating plastic debris density
	14.2 By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans	14.2.1 Proportion of national exclusive economic zones managed using ecosystem-based approaches
	14.3 Minimize and address the impacts of ocean acidification, including through enhanced scientific cooperation at all levels	14.3.1 Average marine acidity (pH) measured at agreed suite of representative sampling stations
	14.4 By 2020, effectively regulate harvesting and end overfishing, illegal, unreported and unregulated fishing and destructive fishing practices and implement science-based management plans, in order to restore fish stocks in the shortest time feasible, at least to levels that can produce maximum sustainable yield as determined by their biological characteristics	14.4.1 Proportion of fish stocks within biologically sustainable levels
	14.5 By 2020, conserve at least 10 per cent of coastal and marine areas, consistent with national and international law and based on the best available scientific information	14.5.1 Coverage of protected areas in relation to marine areas
	14.6 By 2020, prohibit certain forms of fisheries subsidies which contribute to overcapacity and overfishing, eliminate subsidies that contribute to illegal, unreported and unregulated fishing and refrain from introducing new such subsidies, recognizing that appropriate and effective special and differential treatment for developing and least developed countries should be an integral part of the World Trade Organization fisheries subsidies negotiation	14.6.1 Progress by countries in the degree of implementation of international instruments aiming to combat illegal, unreported and unregulated fishing
	14.7 By 2030, increase the economic benefits to small island developing States and least developed countries from the sustainable use of marine resources, including through sustainable management of fisheries, aquaculture and tourism	14.7.1 Sustainable fisheries as a percentage of GDP in small island developing States, least developed countries and all countries
	14.a Increase scientific knowledge, develop research capacity and transfer marine technology, taking into account the Intergovernmental Oceanographic Commission Criteria and Guidelines on the Transfer of Marine Technology, in order to improve ocean health and to enhance the contribution of marine biodiversity to the development of developing countries, in particular small island developing States and least developed countries	14.a.1 Proportion of total research budget allocated to research in the field of marine technology
	14.b Provide access for small-scale artisanal fishers to marine resources and markets	14.b.1 Progress by countries in the degree of application of a legal/regulatory/policy/institutional framework which recognizes and protects access rights for small-scale fisheries
	14.c Enhance the conservation and sustainable use of oceans and their resources by implementing international law as reflected in the United Nations Convention on the Law of the Sea, which provides the legal framework for the conservation and sustainable use of oceans and their resources, as recalled in paragraph 158 of “The future we want”	14.c.1 Number of countries making progress in ratifying, accepting and implementing through legal, policy and institutional frameworks, ocean-related instruments that implement international law, as reflected in the United Nation Convention on the Law of the Sea, for the conservation and sustainable use of the oceans and their resources

15 – Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss	15.1 By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements	15.1.1 Forest area as a proportion of total land area
		15.1.2 Proportion of important sites for terrestrial and freshwater biodiversity that are covered by protected areas, by ecosystem type
	15.2 By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally	15.2.1 Progress towards sustainable forest management
	15.3 By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world	15.3.1 Proportion of land that is degraded over total land area
	15.4 By 2030, ensure the conservation of mountain ecosystems, including their biodiversity, in order to enhance their capacity to provide benefits that are essential for sustainable development	15.4.1 Coverage by protected areas of important sites for mountain biodiversity
		15.4.2 Mountain Green Cover Index
	15.5 Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species	15.5.1 Red List Index
	15.6 Promote fair and equitable sharing of the benefits arising from the utilization of genetic resources and promote appropriate access to such resources, as internationally agreed	15.6.1 Number of countries that have adopted legislative, administrative and policy frameworks to ensure fair and equitable sharing of benefits
	15.7 Take urgent action to end poaching and trafficking of protected species of flora and fauna and address both demand and supply of illegal wildlife products	15.7.1 Proportion of traded wildlife that was poached or illicitly trafficked
	15.8 By 2020, introduce measures to prevent the introduction and significantly reduce the impact of invasive alien species on land and water ecosystems and control or eradicate the priority species	15.8.1 Proportion of countries adopting relevant national legislation and adequately resourcing the prevention or control of invasive alien species
	15.9 By 2020, integrate ecosystem and biodiversity values into national and local planning, development processes, poverty reduction strategies and accounts	15.9.1 Progress towards national targets established in accordance with Aichi Biodiversity Target 2 of the Strategic Plan for Biodiversity 2011-2020
	15.a Mobilize and significantly increase financial resources from all sources to conserve and sustainably use biodiversity and ecosystems	15.a.1 Official development assistance and public expenditure on conservation and sustainable use of biodiversity and ecosystems
	15.b Mobilize significant resources from all sources and at all levels to finance sustainable forest management and provide adequate incentives to developing countries to advance such management, including for conservation and reforestation	15.b.1 Official development assistance and public expenditure on conservation and sustainable use of biodiversity and ecosystems
	15.c Enhance global support for efforts to combat poaching and trafficking of protected species, including by increasing the capacity of local communities to pursue sustainable livelihood opportunities	15.c.1 Proportion of traded wildlife that was poached or illicitly trafficked

Appendix VIII – Tool Outcomes

The eighth appendix contains four screenshots of the automatically generated PDF file. The first image shows the overview/cover page of the case application. The second and third images show the SDG linking page and are also the result of the case application. The fourth image is a screenshot showing an excerpt of the individual assessment of the asset with ID name 'Brambles'. Appendix VIII is the result of the outcomes of the verification steps, and serves as clarifications for section 4.2.1 – Output. In case a more elaborate impression of the tool is required, please visit https://tinyurl.com/ybeusaek.

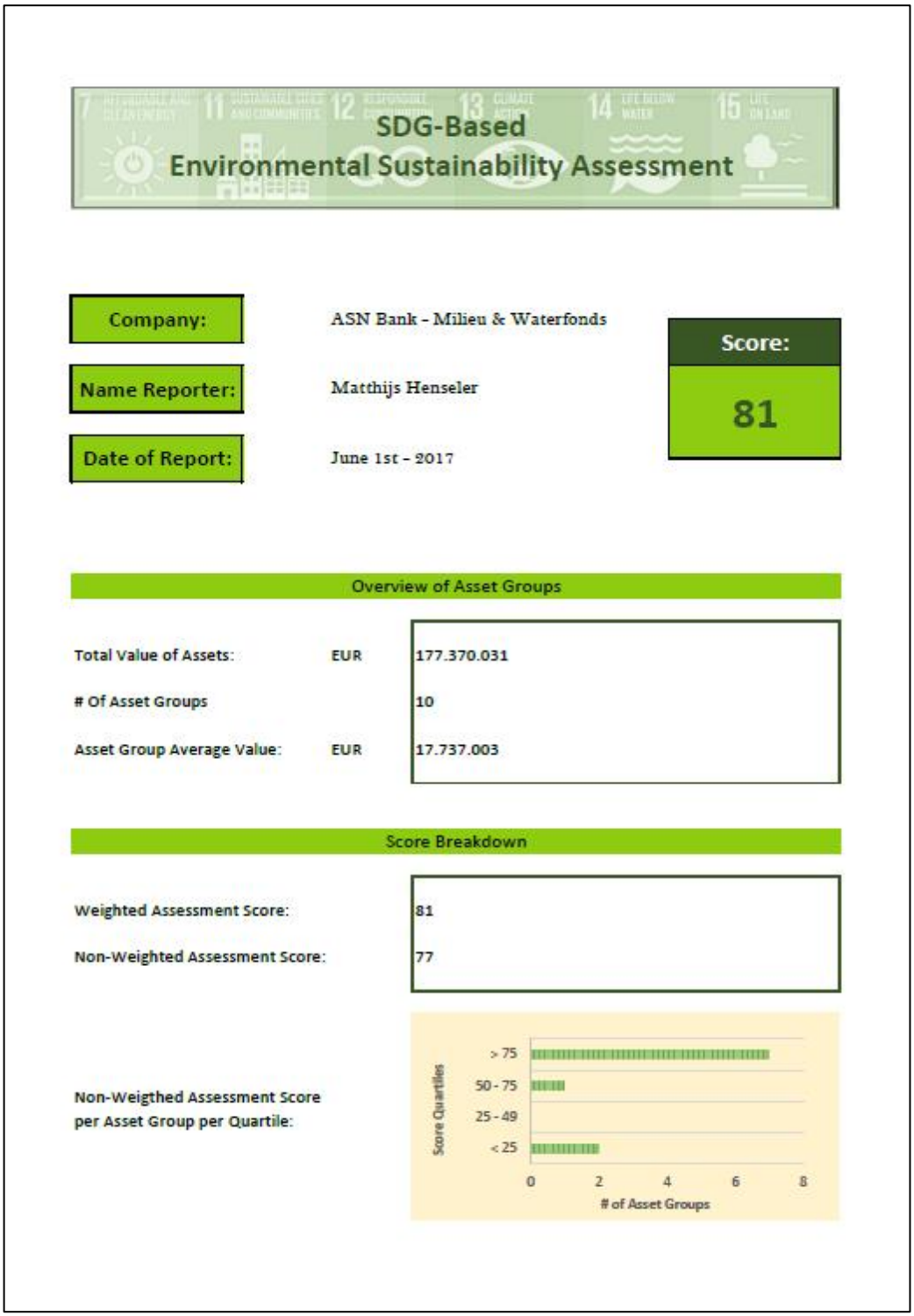

Figure 13 - Screenshot of overview page

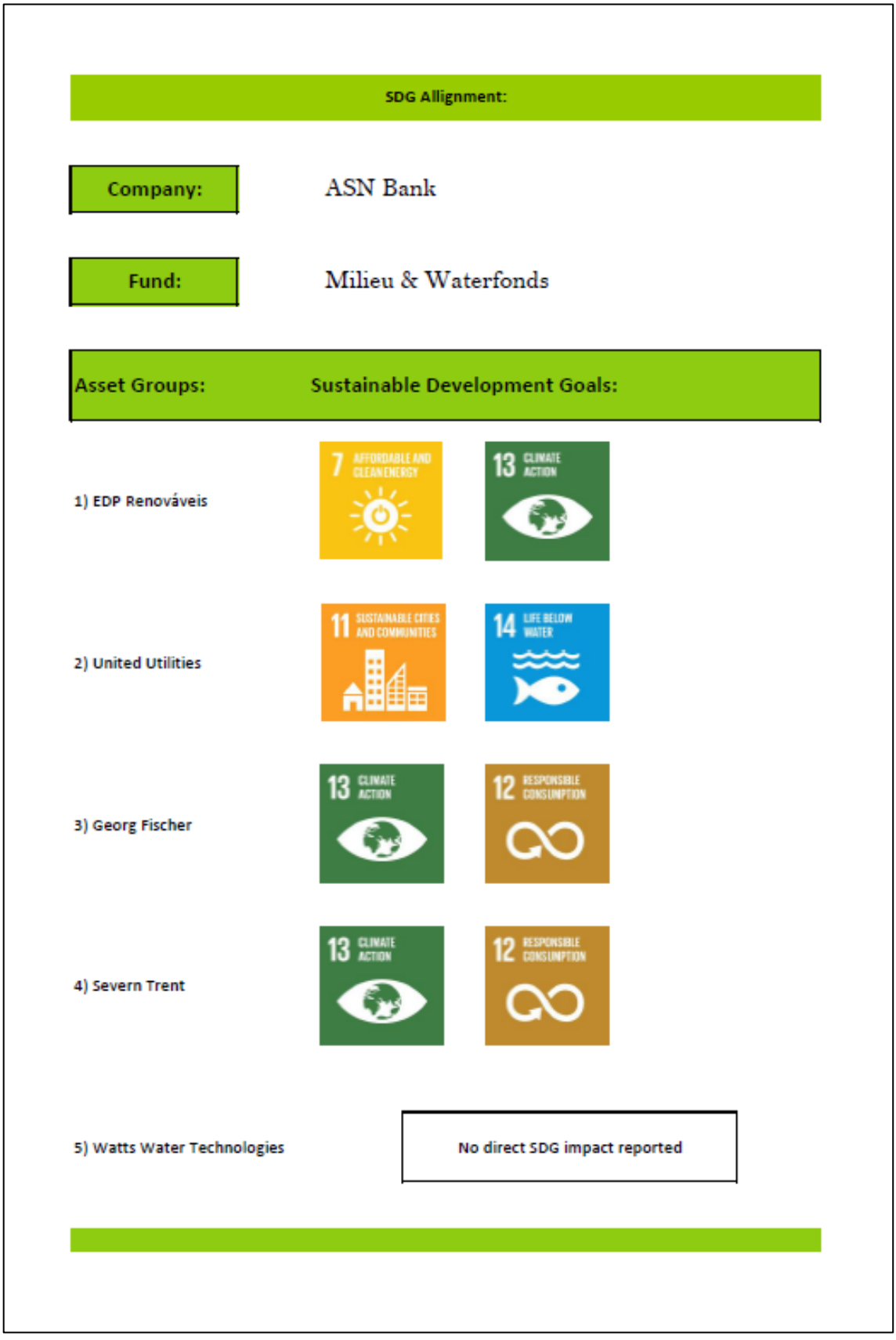

Figure 14 - Screenshot SDG linking page (1)

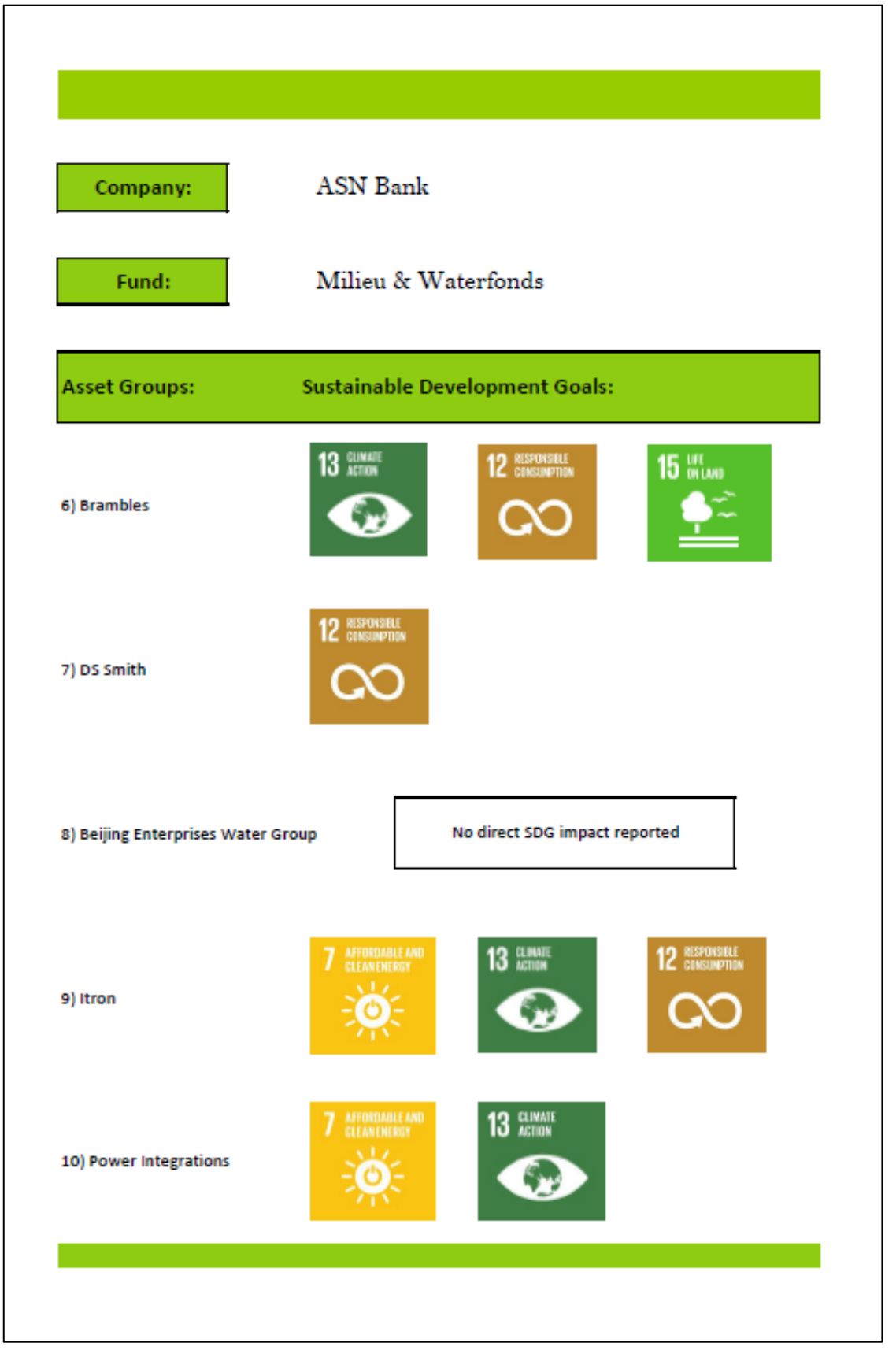

Figure 15 - Screenshot SDG linking page (2)

ID:	**Brambles**
Value:	17.083.347,00 EUR

Positive Impact Claim

The Asset/Asset Group...

Contributes to Climate Mitigation on a regional/national/international level because:

1	Brambles has set CO2 reduction targets for the compnay, which they also managed to achieve in 2015 (2015 is year of last assessment by ASN Bank).

Contributes to reducing the material footrpint (measured per GDP or per Capita) because:

2	Brambles promotes the usage of reusable plastic containers, thereby reducing the material footprint of their organizational production output.

Contributes to a reduction of waste through encouring recycling and/or reusing of waste in the production process because:

3	Because Brambles produces reusable plastic containers, they incentivize customers to reduce their waste.

Promotes the implementation of sustainable management of forests, halts deforestation, restores degraded forests and/or promotes afforestation/reforrestation because:

4	Most pallets are made of wood. All wood is PEFC-certified, meaning that the origin is known. In 2014, 69% of all its wood was sourced from hig-income countries.
5	

Negative Impact Factor

No Negative Impact Factors Selected

Figure 16 - Excerpt of sub assessment (Brambles)

Appendix IX – Tool Validation Interview

The ninth appendix contains both the interview protocol designed for the validation interviews with Mr. Korslund and Mr. Thuysbaert, as well as the answers provided. The interpretation of the validation interviews is presented in section 4.3.2 – Expert Opinion.

Interviewer:	Matthijs Henseler
Interviewee:	David Korslund
Organization	Global Alliance for Banking on Values
Role:	Senior Economist
Date:	20-6-2017
Duration:	55 minutes

Introduction

The tool is developed keeping in mind that there is a scientific and reporting gap when it comes to assessing the indirect environmental sustainability of financial institutions based primarily on the UN's Sustainable Development Goals. Therefore, the following objective statement has been composed for this thesis:

> *''To introduce a prototype system, also referred to as a tool, which is capable of incorporating components of the SDGs so that they may form the criteria based on which financial institutions' core business activity, their balance-sheets, can be assessed in terms of environmental sustainability.''*

During interviews with financial sector practitioners who deal with matters of sustainability on a daily basis, numerous needs for such a tool have been identified. This interview will consist of two parts: (1) a theoretical part and (2) a practical part. The theoretical part will mostly concern itself with the underlying assumptions forming the basis of the system, such as the needs. The practical part will include a 'tour' through the system and an example output, which can be commented on freely by the interviewee. After this 'tour', comments may be added on the theoretical part.

Theoretical part

1. Seven *need categories* have been identified from the interviews, namely:

    1) Efficiency
    2) Consistency
    3) Objectivity
    4) Transparency
    5) Iterability
    6) Materiality
    7) Data Availability

    A) Before having seen the tool, does this list of needs seem sufficiently exhaustive for a tool designed to deal with the objective as describe in the introduction? Do any potential needs that could be added come to mind?

Mr. Korslund answered that the word iterability should be reconsidered. He understands what is meant by iterability, but would rather suggest using the word 'evolutionary' or 'adaptability'. Additionally, Mr. Korslund argues that data availability perhaps is more a sub-group of efficiency, considering that a tool cannot be efficient if the right data is not available for the inputs. Besides these two points, Mr. Korslund believes the list to be sufficiently exhaustive on a first glance.

    B) Please reorder the seven needs according to how important you think the needs are.

        1) Materiality
        2) Efficiency / Data Availability
        3) Objectivity
        4) Consistency
        5) Transparency
        6) Iterability (evolutionary or adaptability)

2. Figure 17 presents a schematic overview of the process for scoring an asset/asset group. If an asset/asset group can only be linked to an SDG in a positive manner, it will obtain the highest score. If an asset/asset group can also be linked to an SDG in a negative manner, it will obtain the lowest score. If, however, mitigating factors are in place, a score ranging between 0 and 100 may be given to the asset/asset group, according to the effectiveness of the mitigation strategy. (The idea for this 'three-step scoring method' is based on the TBL decision tree). Does this process make sense on a first glance?

Mr. Korslund argued that in big lines this process indeed makes sense. However, he also stressed concern for a lack of nuance in the process. For example, Korslund noted that the process could be improved if only a maximum score would be granted when several SDGs are impacted. In similar

fashion, Korslund argued that if only one negative impact factor would apply on an asset / asset group, that should not necessarily result in the minimum score.

Moreover, the mitigation part of the process should be defined more concretely according to Korslund. He illustrated his opinion with an example of an organic farm. If a financial institution grants a loan to a farm using migrant labor in an abusive manner, both positive and negative factors are impacted. The negative factors should only be 'allowed' to be mitigated if there is a solid strategy in place in the shape of a concrete plan, tracing the progress regarding the abusive labor quantitatively over time.

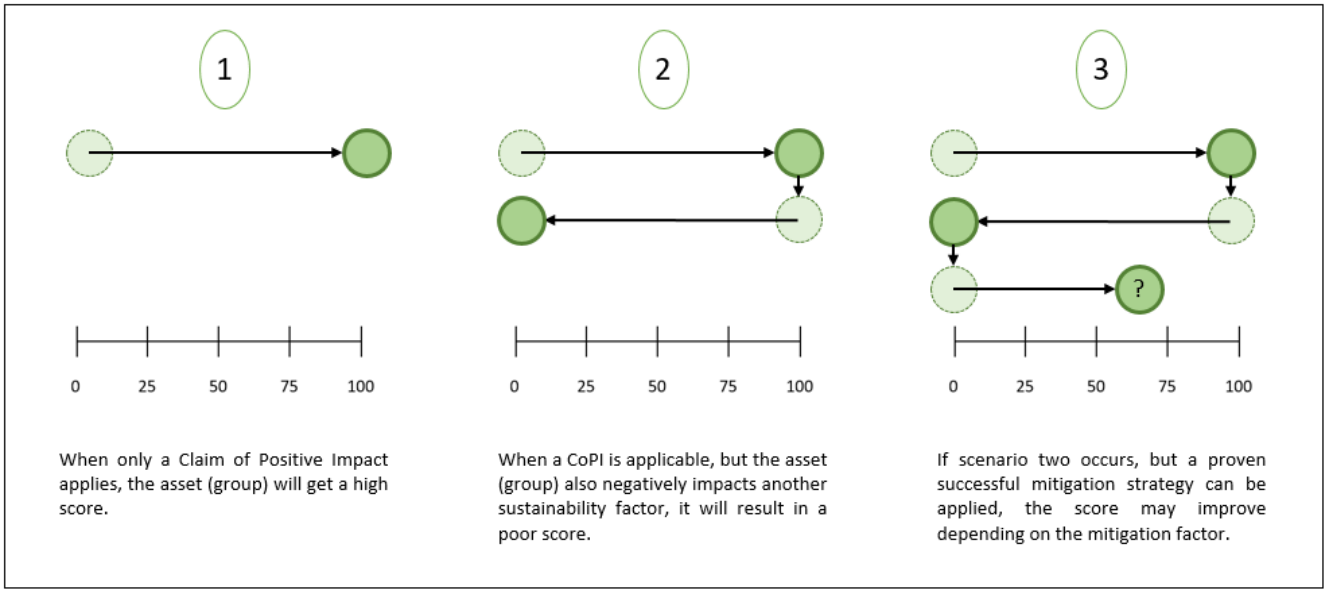

Figure 17 - Graphical representation of scoring procedure

3. The final score of the assessment is calculated as the weighted average of each individual asset/asset group score (weighted using the monetary value of each asset/asset group within the assessment). Does this method seem appropriate? Would you prefer a score on a numerical scale (e.g. 0-100 or 0-50), or another scale (e.g. -- / - / 0 / + / ++). Why?

Mr. Korslund pointed out a concern that a scale ranging from 0-100 might suggest an unreasonable level of accuracy. Instead, he agreed that the option of the five-category scale (-- / - / 0 / + / ++) would be more appropriate given the qualitative nature of the tool.

4. Figure 18 is a screenshot of the first page of the automatically generated PDF file (plus comments) which is presented after completion of the assessment. Without having used the system before, does this 'score page' look complete (i.e. does it contain all necessary information? Is it confusing? Any comments on the lay-out?). Same question for figure 19, which is a screenshot from an example of the SDG-linking page.

With regard to figure 18, Korslund noted that the overview page could be improved if a comparison to a peer group was added. Moreover, (for future versions) a development over time would be an interesting addition according to Korslund.

With regard to figure 19, Korslund noted that the linking page should capture the magnitude of the impact a company/asset has on an SDG. He also stated that this impact would ideally be measured per individual SDG the company/asset is linked to, also allowing for potential double counting of the impact (e.g. 70% of a company's revenue is derived from activities supporting SDG 7 and 55% of a company's revenue is derived from activities supporting SDG 11. That the total adds up to more than 100% is not an issue).

5. In accordance with the fourth identified constraint, this tool predominantly uses qualitative data. To what extent do you believe it is appropriate to rely only on qualitative data, and where do you see possibilities to incorporate quantitative data in future versions of the tool?

Korslund stressed that ideally, a combination of both qualitative and quantitative data inputs is used. Both forms of input independently do not tell the whole story. One way in which quantitative data can be incorporated according to Korslund, is to include for a certain company [e.g. when used as an asset because stocks of said company are held] the percentage of their major business activities that are impacting an SDG. These business activities could be expressed in company revenue, investments or expenses for example. Also, impact could be quantified in a non-monetary manner. If the asset assessed is for example a renewable energy project consisting of windmills, the impact could be expressed in number of households receiving green electricity from the project.

6. The assessment consists of several sub assessments. The content of the sub assessment can be freely chosen by the assessor. However, it is recommended that assets are broken down up to the point where they are no longer distinguishable by the results yielded from the sub assessment. For example: a loan portfolio consisting of mortgages may be assessed as one, but only if all individual mortgages are of a similar nature (e.g. size, purpose). In case that the individual mortgages are drastically different from one another (e.g. social housing and offices), the loan portfolio should be broken up into the individual mortgages. Does this approach make sense to you? If not, how would you improve this approach?

According to Korslund, the critical issue here is how you identify groups of assets versus individual assets. Continuing the examples of the mortgages: a first breakdown could be residential mortgages (of similar size and value). However, you can still take this portfolio and split it in first time buyers, environmentally driven buyers etc. What is missing is setting up the principles for how you decide whether you use an individual asset or a group. Hence, a standardized protocol is missing here. Including such a protocol is important to guarantee compliance with identified needs such as consistency and transparency.

Interviewer:	Matthijs Henseler
Interviewee:	Bram Thuysbaert
Organization	FMO – Dutch Development Bank
Role:	Senior Evaluation Officer
Date:	9-8-2017
Duration:	60 minutes

Introduction

The tool is developed keeping in mind that there is a scientific and reporting gap when it comes to assessing the indirect environmental sustainability of financial institutions based primarily on the UN's Sustainable Development Goals. Therefore, the following objective statement has been composed for this thesis:

> *''To introduce a prototype system, also referred to as a tool, which is capable of incorporating components of the SDGs so that they may form the criteria based on which financial institutions' core business activity, their balance-sheets, can be assessed in terms of environmental sustainability.''*

During interviews with financial sector practitioners who deal with matters of sustainability on a daily basis, numerous needs for such a tool have been identified. This interview will consist of two parts: (1) a theoretical part and (2) a practical part. The theoretical part will mostly concern itself with the underlying assumptions forming the basis of the system, such as the needs. The practical part will include a 'tour' through the system and an example output, which can be commented on freely by the interviewee. After this 'tour', comments may be added on the theoretical part.

Theoretical part

1. Seven *need categories* have been identified from the interviews, namely:

    1) Efficiency
    2) Consistency
    3) Objectivity
    4) Transparency
    5) Iterability
    6) Materiality
    7) Data Availability

A) Before having seen the tool, does this list of needs seem sufficiently exhaustive for a tool designed to deal with the objective as describe in the introduction? Do any potential needs that could be added come to mind?

According to Mr. Thuysbaert, the needs currently addressed in this list all make sense and contribute to the objective as described in the introduction. When asked for a contribution, Mr. Thuysbaert mentioned that he missed a need representing the fact that the tool should be able to track the sustainability impact of an asset over time. He thought 'accountability' to be a good name for this need.

B) Please reorder the seven needs according to how important you think the needs are.

1) Consistency - Objectivity – Transparency
2) Data availability - Materiality - Accountability
3) Efficiency
4) Adaptability

2. Figure 17 presents a schematic overview of the process for scoring an asset/asset group. If an asset/asset group can only be linked to an SDG in a positive manner, it will obtain the highest score. If an asset/asset group can also be linked to an SDG in a negative manner, it will obtain the lowest score. If, however, mitigating factors are in place, a score ranging between 0 and 100 may be given to the asset/asset group, according to the effectiveness of the mitigation strategy. (The idea for this 'three-step scoring method' is based on the TBL decision tree). Does this process make sense on a first glance?

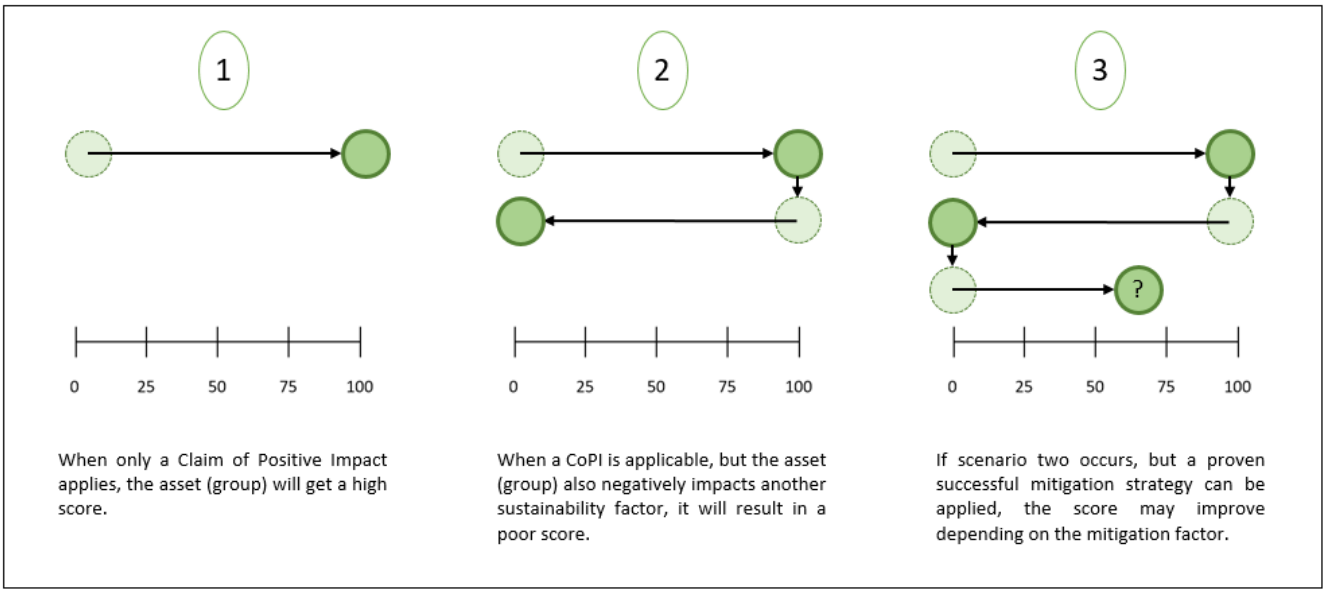

Figure 18 - Graphical representation of scoring procedure

Given the qualitative nature of the data, Mr. Thuysbaert acknowledges that it is difficult to objectively order the assessments, especially when differences are very small (e.g. comparing a score of 65 with a score of 66). He suggests that qualitative scores could still be ranked by asking the user of the tool positive impact of the individual assets on SDGs. Additionally, he mentions the regional discrepancies

when assessing the importance of an SDG, including this aspect could further contextualize a positive impact. In many cases a certain SDG might be more important than another SDG for an investor, this nuance should be included in future versions. De gebruiker vragen om prioriteiten aan te brengen, het rangschikken van positieve impact op SDGs. Ook regionale impact interessant om een positieve bijdrage te contextualiseren. In vele gevallen is de ene SDG belangrijker dan de andere voor een investeerder – deze nuance meenemen in toekomstige versie.

3. The final score of the assessment is calculated as the weighted average of each individual asset/asset group score (weighted using the monetary value of each asset/asset group within the assessment). Does this method seem appropriate? Would you prefer a score on a numerical scale (e.g. 0-100 or 0-50), or another scale (e.g. -- / - / 0 / + / ++). Why?

Mr. Thuysbaert argues that there is not really that much difference between a score of 0-100 and --/-/0/+/++ once the results are aggregated in a summarizing overview. Instead, he argues that the problem is in the objectivity of the score. Ranking the assessments 0-100 would not be an issue if the method is only used internally and the rules for using the method are clear. Comparing close scores for different companies, however, might be difficult if the scores only differ in a minor way. For example, an FMO score of 66 could probably be compared to an FMO score of 67 in case the assessments were conducted by the same person, concluding that the latter score is better. However, an ING score of 66 could not necessarily be called worse than an ABN AMRO score of 67 because of the limited objectivity, which introduces an uncertainty range.

4. Figure 18 is a screenshot of the first page of the automatically generated PDF file (plus comments) which is presented after completion of the assessment. Without having used the system before, does this 'score page' look complete (i.e. does it contain all necessary information? Is it confusing? Any comments on the lay-out?). Same question for figure 19, which is a screenshot from an example of the SDG-linking page.

The front page makes sense according to Mr. Thuysbaert, although he would like to add the type of the assets inside the portfolio (Stocks? Obligations? Mortgages?). Moreover, a brief, visualized summary of the most important SDGs that are impacted by the portfolio would be a good addition. Figure 19 also shows added value, although Mr. Thuysbaert showed concern in case the portfolio contains hundreds of SDGs. In that case, it would be preferable to aggregate the results. This aggregated result could perhaps be carried over onto the front page.

5. In accordance with the fourth identified constraint, this tool predominantly uses qualitative data. To what extent do you believe it is appropriate to rely only on qualitative data, and where do you see possibilities to incorporate quantitative data in future versions of the tool?

Mr. Thuysbaert identifies the fact that predominantly qualitative data is used as a big drawback of the tool. He stresses the importance of objectivity for the tool, which requires to a certain extent the inclusion of quantitative data. Especially for environmental SDGs this should be possible. However, he also acknowledges that including quantitative data for the social SDGs will be very difficult, making it hard to introduce objectivity in the negative screening part of the tool.

6. The assessment consists of several sub assessments. The content of the sub assessment can be freely chosen by the assessor. However, it is recommended that assets are broken down up to the point where they are no longer distinguishable by the results yielded from the sub assessment. For example: a loan portfolio consisting of mortgages may be assessed as one, but only if all individual mortgages are of a similar nature (e.g. size, purpose). In case that the individual mortgages are drastically different from one another (e.g. social housing and offices), the loan portfolio should be broken up into the individual mortgages. Does this approach make sense to you? If not, how would you improve this approach?

In case the portfolio is very large (in the range of hundreds of assets), perhaps it will be better to cluster the assets in order to keep the workload for the tool manageable. Alternatively, it could be an idea to introduce the usage of the tool in the approval phase of an investment, in order to spread the workload for completing the assessments. This way, gradually an aggregated environmental sustainability image of the portfolio will form. Mr. Thuysbaert imagines that the resources a financial institution is willing to spend on such an assessment greatly differs per institution and type of asset. Some financial institutions will be willing to spend more time and money on this than others. Likewise, some type of portfolios will cost more time to assess than others (Mr. Thuysbaert mentioning that for example it would be comparable easy to assess a portfolio of mortgages).

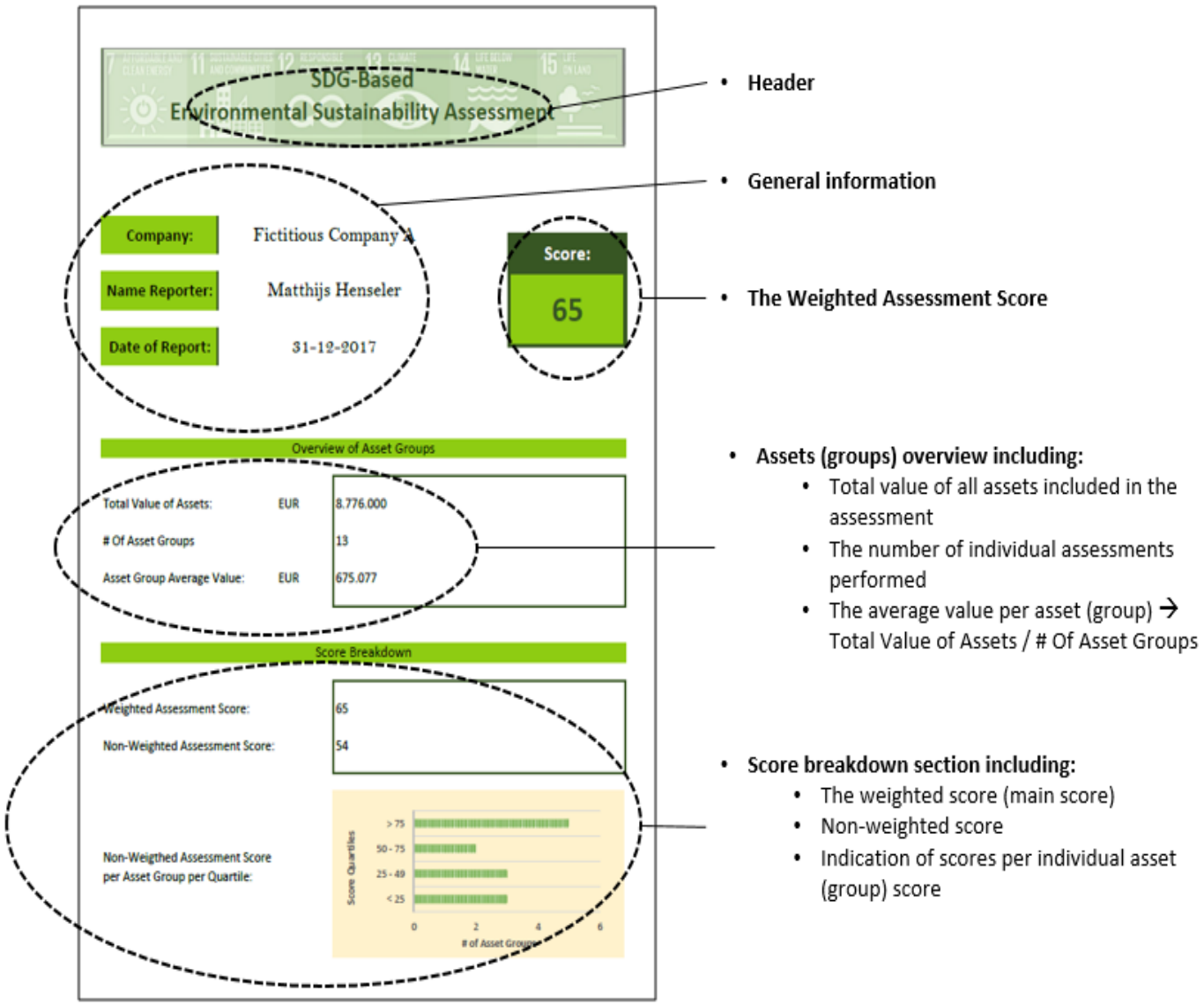

Figure 19 - Screenshot of front page, including the weighted, overall score

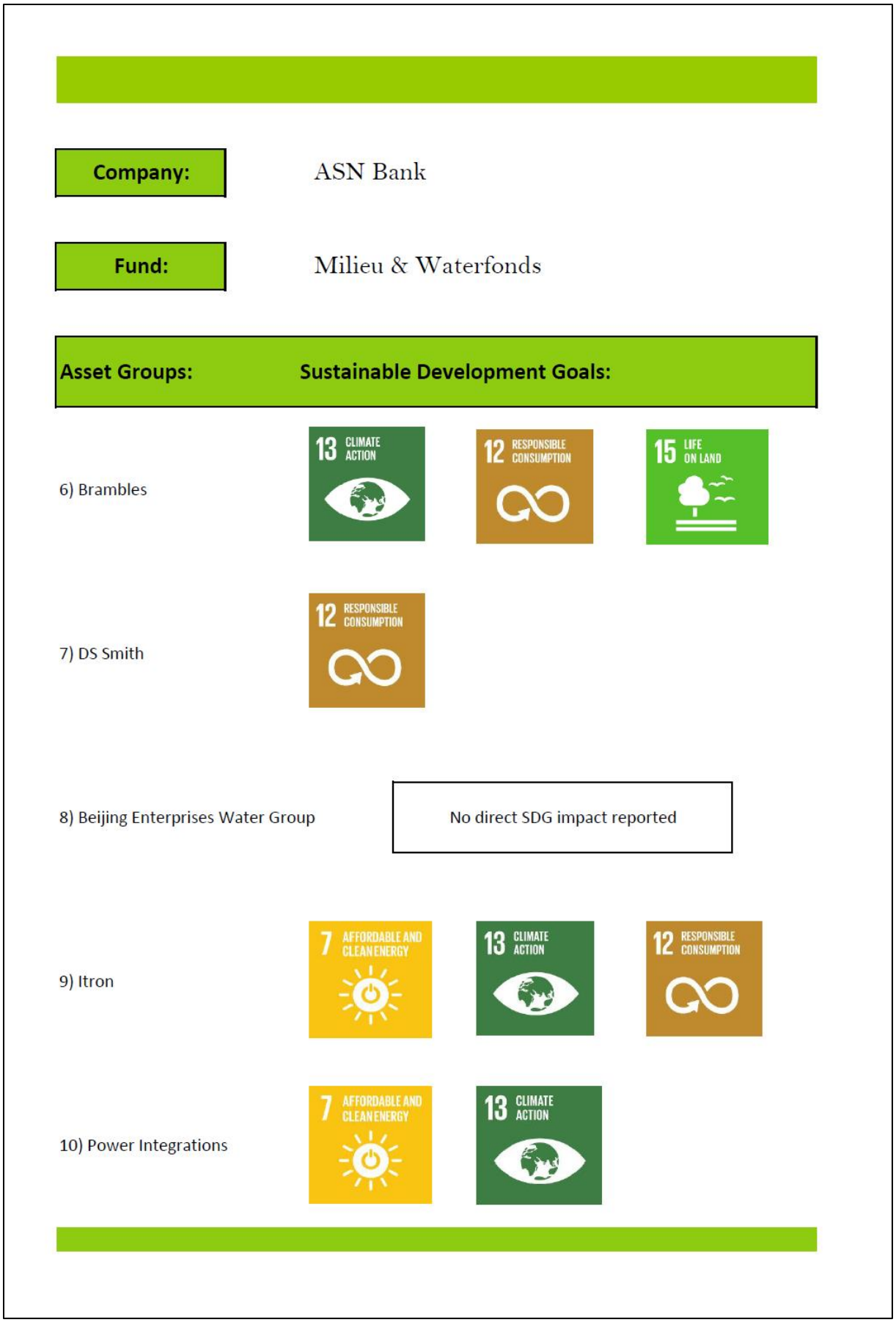

Figure 20 - Screenshot of page linking asset groups to SDGs

Appendix X – Real economy concept

The Global Alliance for Values makes a distinction between 'Real Economy' and 'Financial Economy' assets/activities. Figure 20 and figure 21 are excerpts from a GABV presentation elaborating further on the real economy classification concept.

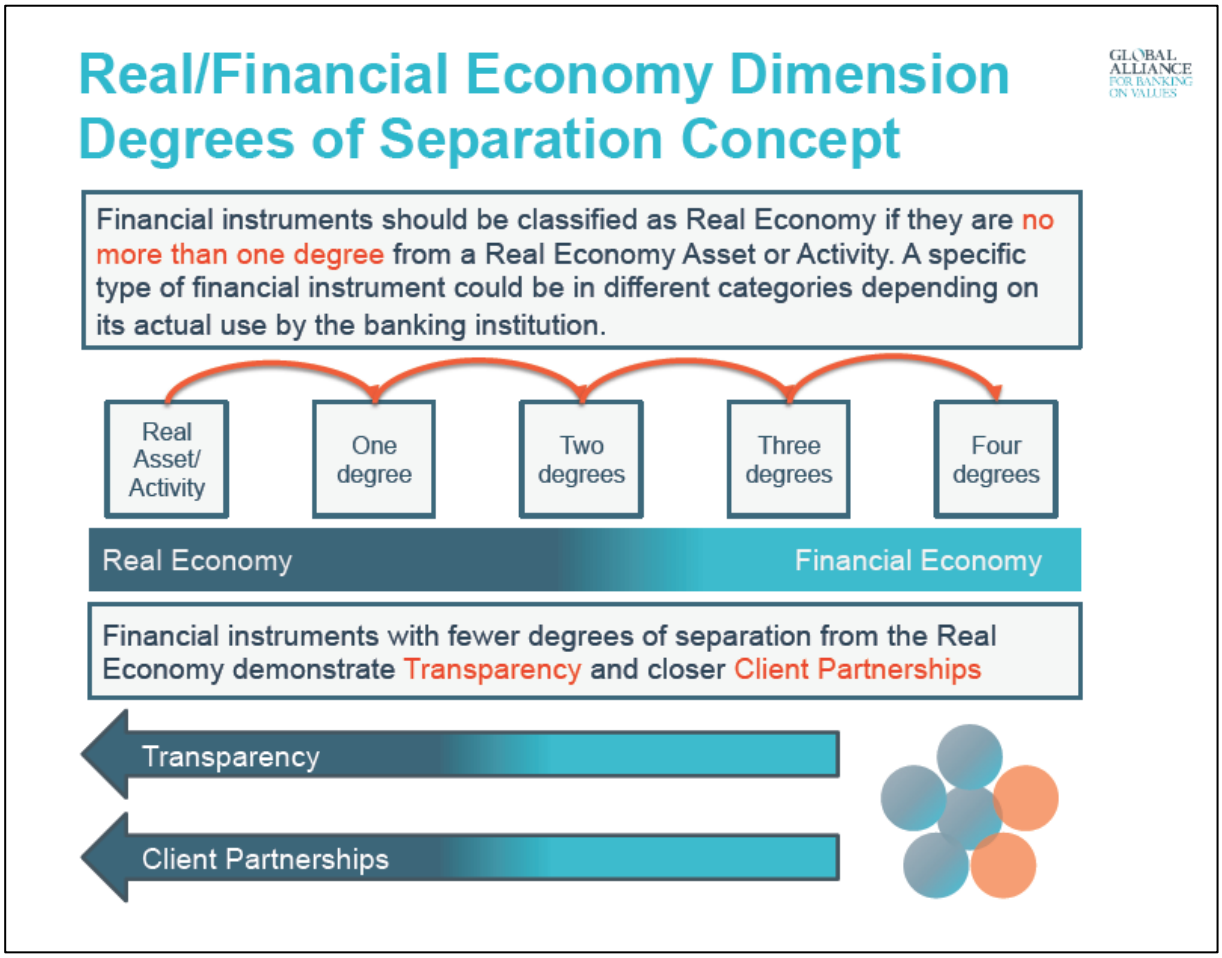

Figure 21 - GABV real economy concept

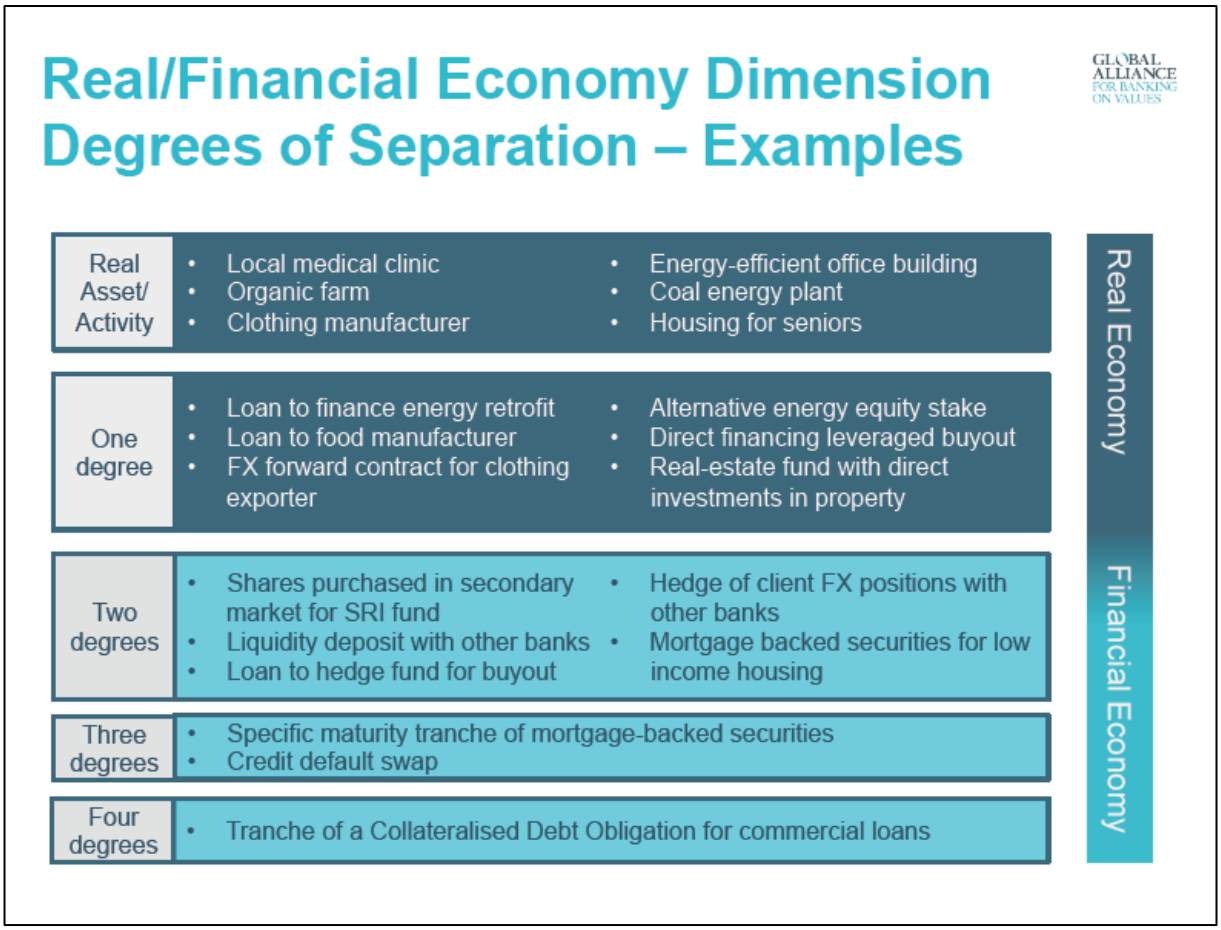

Figure 22 - GABV real economy examples

Appendix XI – Stakeholder Map

The eleventh Appendix offers an insight in the diverse set of stakeholders potentially interested in the solutions offered by the prototype tool proposed in this thesis. The stakeholder groups can be divided in three overarching categories: (1) Civil society, (2) Private sector and (3) Government. Each of these categories contains several illustrative examples (in bold), as well as concrete examples of stakeholders. The stakeholders can be viewed in in figure 22. The group of users kept in mind during the design of the prototype tool, which has been selected from the list of stakeholders presented below, are the ***financial institutions*** (section 4.1.1 – The User).

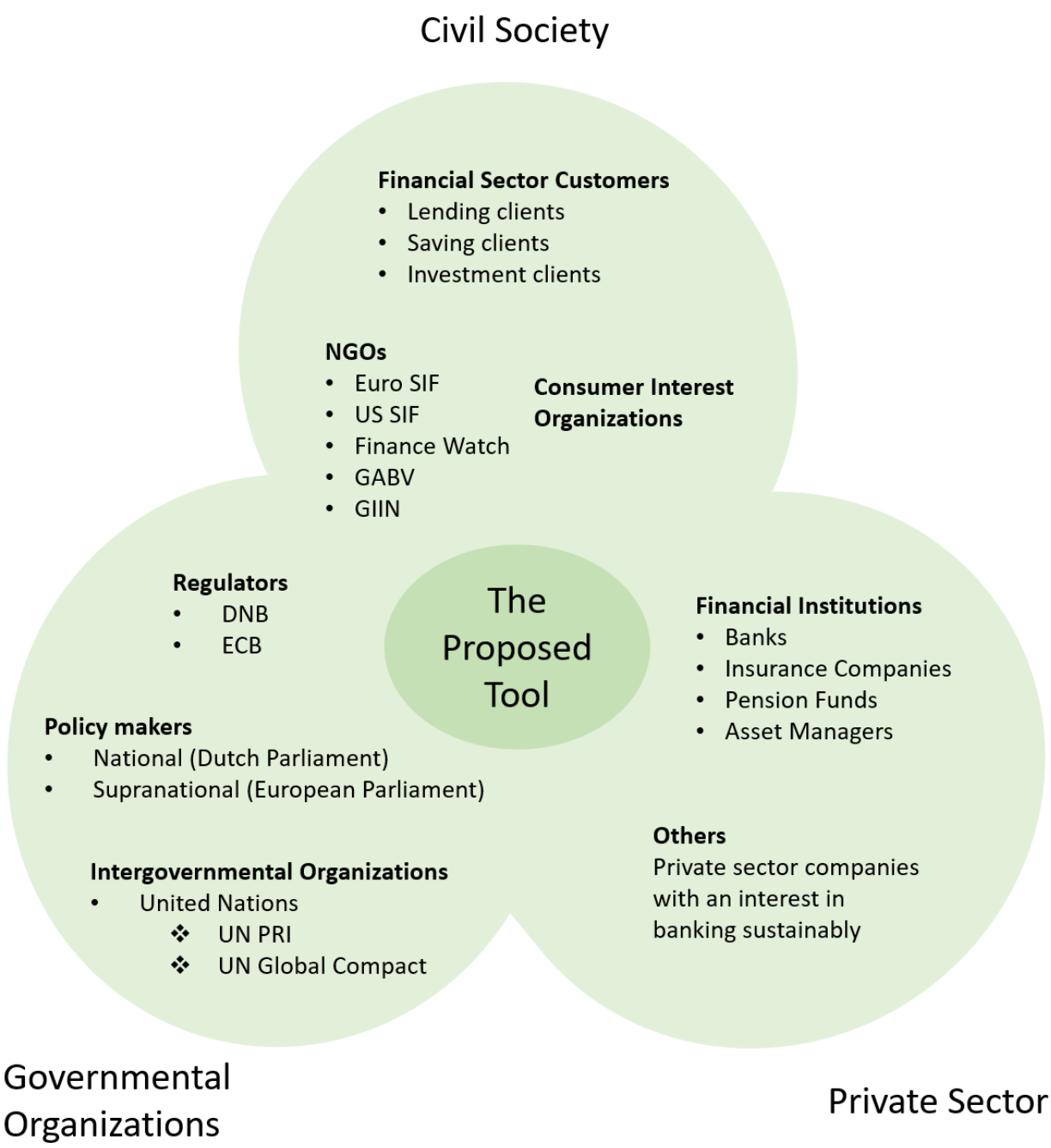

Figure 23 - Stakeholder map

Appendix XII – The Prototype Tool

Figure 23 presents a screenshot of the landing page of the tool, it corresponds to the beginning of the *main assessment*. The only information requested at this point is the input of general information, including the name of the company which is being assessed, the name of the reporter conducting the assessment and the current date.

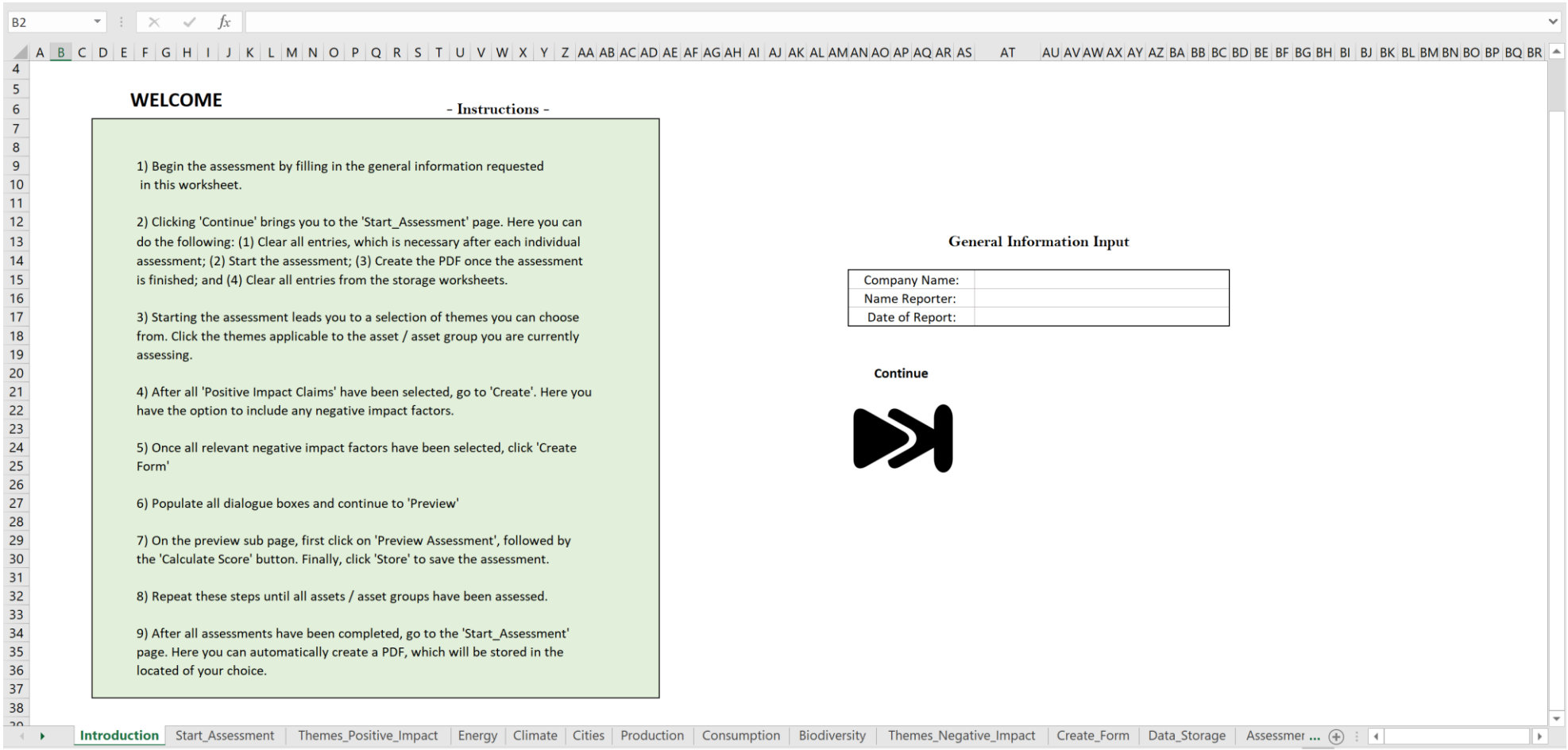

Figure 24 - Landing page of the prototype tool

Figure 24 presents a screenshot of the homepage, corresponding to the beginning of figure 6. This page can be reached by clicking the 'continue' button on the landing page of the tool and is the starting point of each individual assessment. The options on this page include (1) Clear Entries; allowing the user to begin a new sub assessment, (2) Start Assessment; this button brings forward the first relevant page when completing sub assessments, (3) Create PDF; enabling the user to print all information completed up to that point in a standard PDF layout and (4) Empty Assessment Storage, allowing the user to erase any progress up to that point and start over.

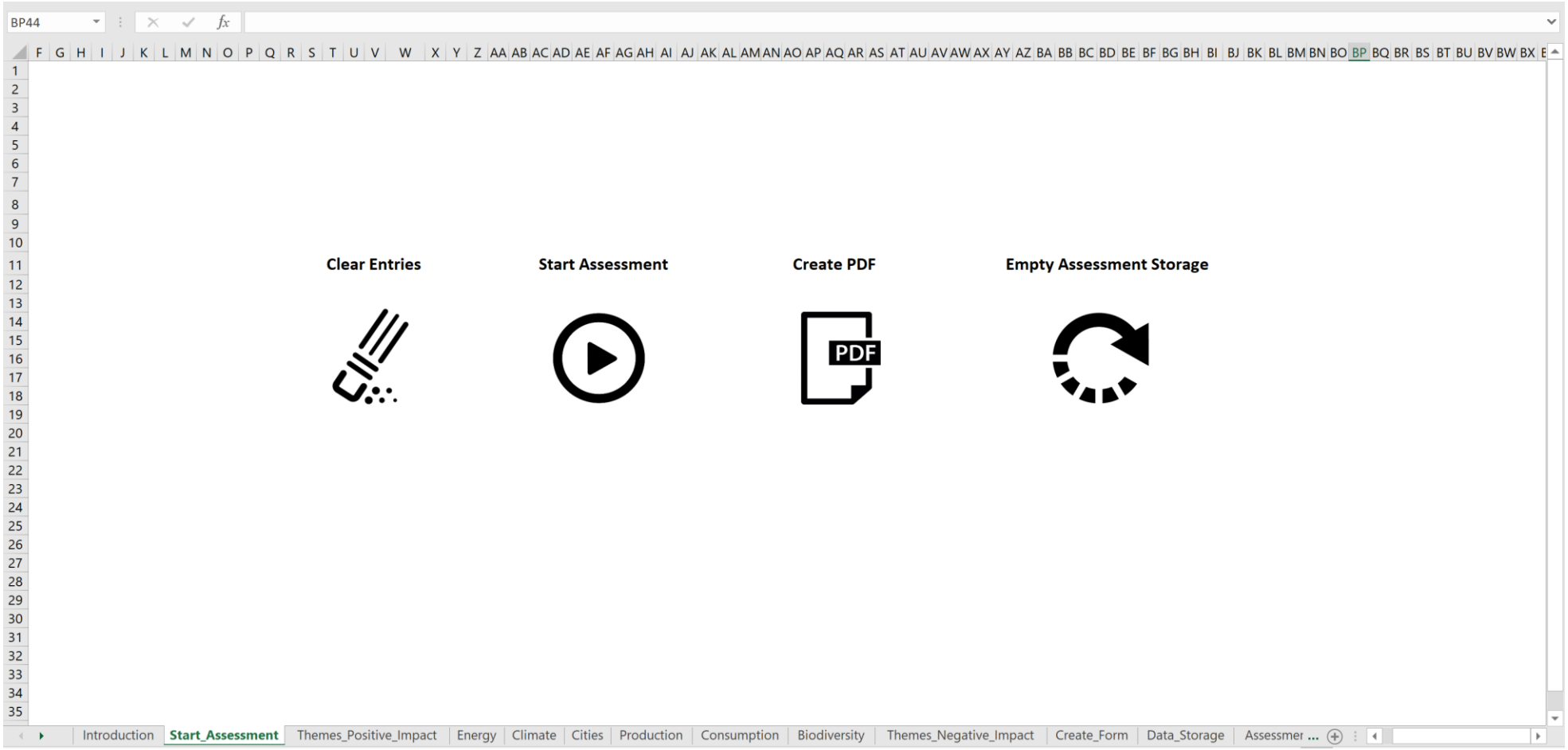

Figure 25 - Starting point for the sub assessments

Figure 25 presents a screenshot of the page presenting the themes on which an asset/asset group might have positive impact. Selecting any of these six themes will guide the user to the *claims of positive impact*. These six themes are the author's personal interpretation of the environmental side of the SDGs, and were chosen to simplify the process of selecting positive impact claims.

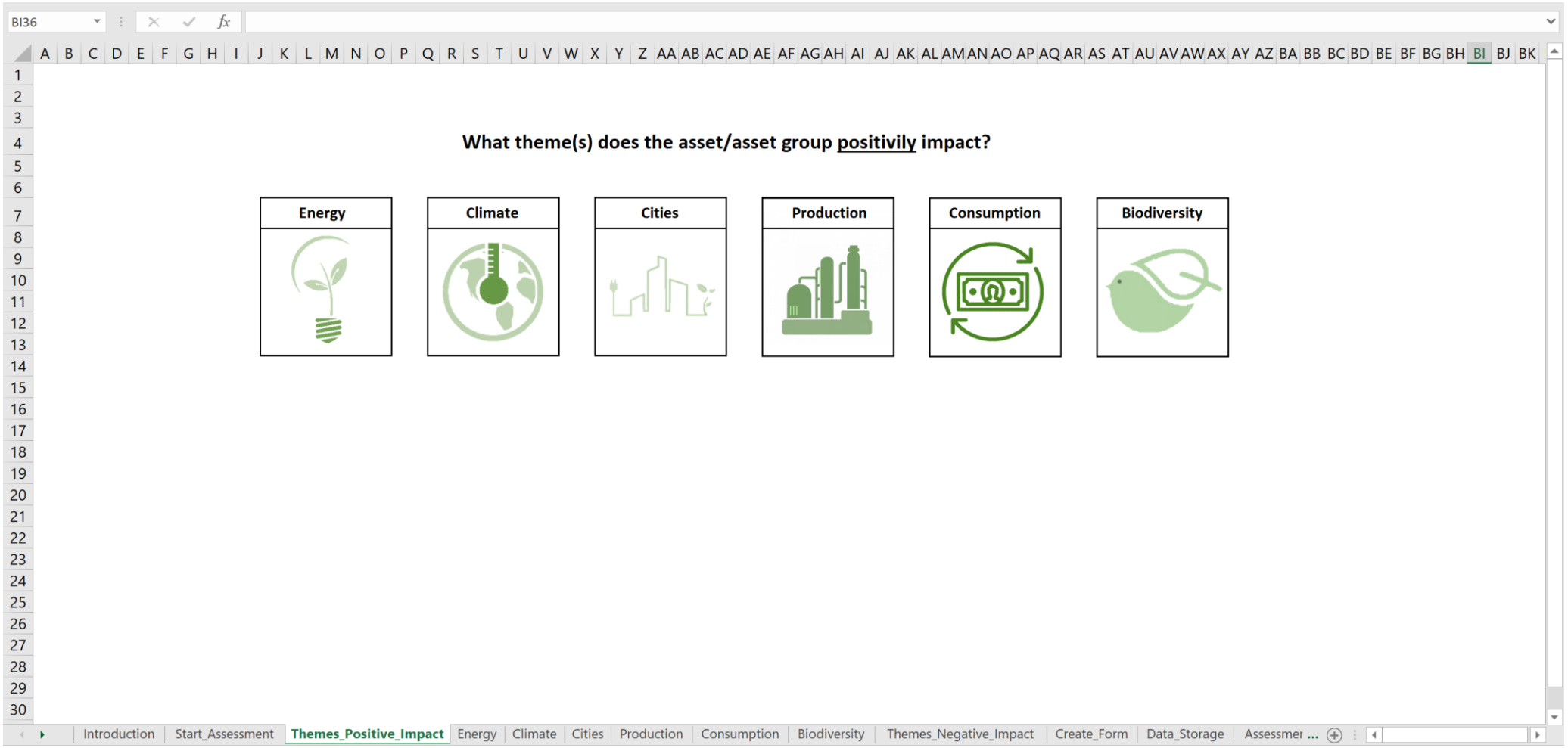

Figure 26 - Themes of positive impact

Figure 26 presents an example of the *claims of positive impact* page. For this example, the theme 'Biodiversity' was chosen, focusing only on the terrestrial CoPIs. In this screenshot, positive impact claims number one and three were selected as true, resulting in their respective buttons turning green. Table 13 on the next page contains all claims of positive impact in written form. These are directly based on the content of table 12 and have been rewritten only to enhance compatibility with the prototype tool.

Figure 27 - Claims of Positive Impact page, terrestrial biodiversity

Table 13 - List of Claims of Positive Impact

Theme	Number	Claim of Positive Impact
Energy	*1.*	The Asset/Asset Group improves the accessibility to renewable energy on a household level.
	2.	The Asset/Asset Group increases the share of renewable energy in the regional/national/international energy mix.
Climate	*3.*	The Asset/Asset Group contributes to Climate Adaptation on a regional/national/international level.
	4.	The Asset/Asset Group contributes to Climate Mitigation on a regional/national/international level.
	5.	The Asset/Asset Group contributes via primary/secondary/tertiary education curricula to climate change awareness, thereby indirectly stimulating climate mitigation/adaptation and impact reduction on a regional/national/international level.
Cities	*6.*	The Asset/Asset Group increases access to Public Transportation.
	7.	The Asset/Asset Group reduces the ratio of Land Consumption to Population Growth (i.e. mitigates Urban Sprawl).
	8.	The Asset/Asset Group contributes to better inner-city waste management - Including both Collection and Discharge initiatives.
	9.	The Asset/Asset Group contributes to reducing the annual mean level of fine particular matter (e.g. PM2.5 and PM10) in cities (population weighted).
Production	*10.*	The Asset/Asset Group contributes to reducing the material footprint (measured per GDP or per Capita).
	11.	The Asset/Asset Group contributes to (1) a reduction of hazardous waste generated (per capita) or (2) a proportional increase in the environmentally sound management of hazardous waste.
	12.	The Asset/Asset Group contributes to a reduction of waste through encouraging recycling and/or reusing of waste in the production process.
Consumption	*13.*	The Asset/Asset Group contributes to a reduction of food waste at consumer/retail/supply chain/production level per capita.
	14.	The Asset/Asset Group contributes to a reduction of waste through encouraging prevention and/or reduction of waste through consumption behavior.
	15.	The Asset/Asset Group - enables access to / creates awareness for sustainable lifestyles in harmony with nature (e.g. through incorporating the topic of sustainable development in education curricula).

Biodiversity	*16.*	The Asset/Asset Group contributes to an increase of the ratio Forest Area to Total Land Area.
	17.	The Asset/Asset Group promotes the implementation of sustainable management of forests, halts deforestation, restores degraded forests and/or promotes afforestation/reforestation.
	18.	The Asset/Asset Group proportionally contributes to restoring degraded land and soil, included land affected by - desertification, droughts and floods.
	19.	The Asset/Asset Group contributes to halting the loss of biodiversity, e.g. through reducing the degradation of natural habitats and/or supporting measures to prevent the extinction of threatened species (as measured in the *'Red List Index')*.
	20.	The Asset/Asset Group proportionally contributes to reducing the trade of poached and/or illicitly trafficked wildlife.
	21.	The Asset/Asset Group contributes to the prevention and significant reduction of marine pollution of all kinds - and in particular from land-based activities.
	22.	The Asset/Asset Group contributes to reducing marine acidity (measured in pH) where necessary in agreement with representative sampling stations.
	23.	The Asset/Asset Group contributes to the prevention of overfishing, unreported/unregulated fishing and/or destructive fishing practices - in order to proportionally increase fish stocks (by species and region) to biologically sustainable levels.
	24.	he Asset/Asset Group contributes to sustainable fishing practices - e.g. sustainably managed fisheries, aquaculture and tourism.

Figure 27 presents a screenshot of the negative impact factors that are to be selected before a sub assessment can be completed. This activity is the last input step of *Part 1* of the tool's architectural structure (figure 6). The user is requested to select those themes on which the asset/asset group has a negative impact. There are 12 themes that can be chosen, which represent the author's personal interpretation of all sustainable development goals. In figure 27, the themes number 2, 5, 7, 9 and 12 have been selected, resulting in a green highlight indicating the selection.

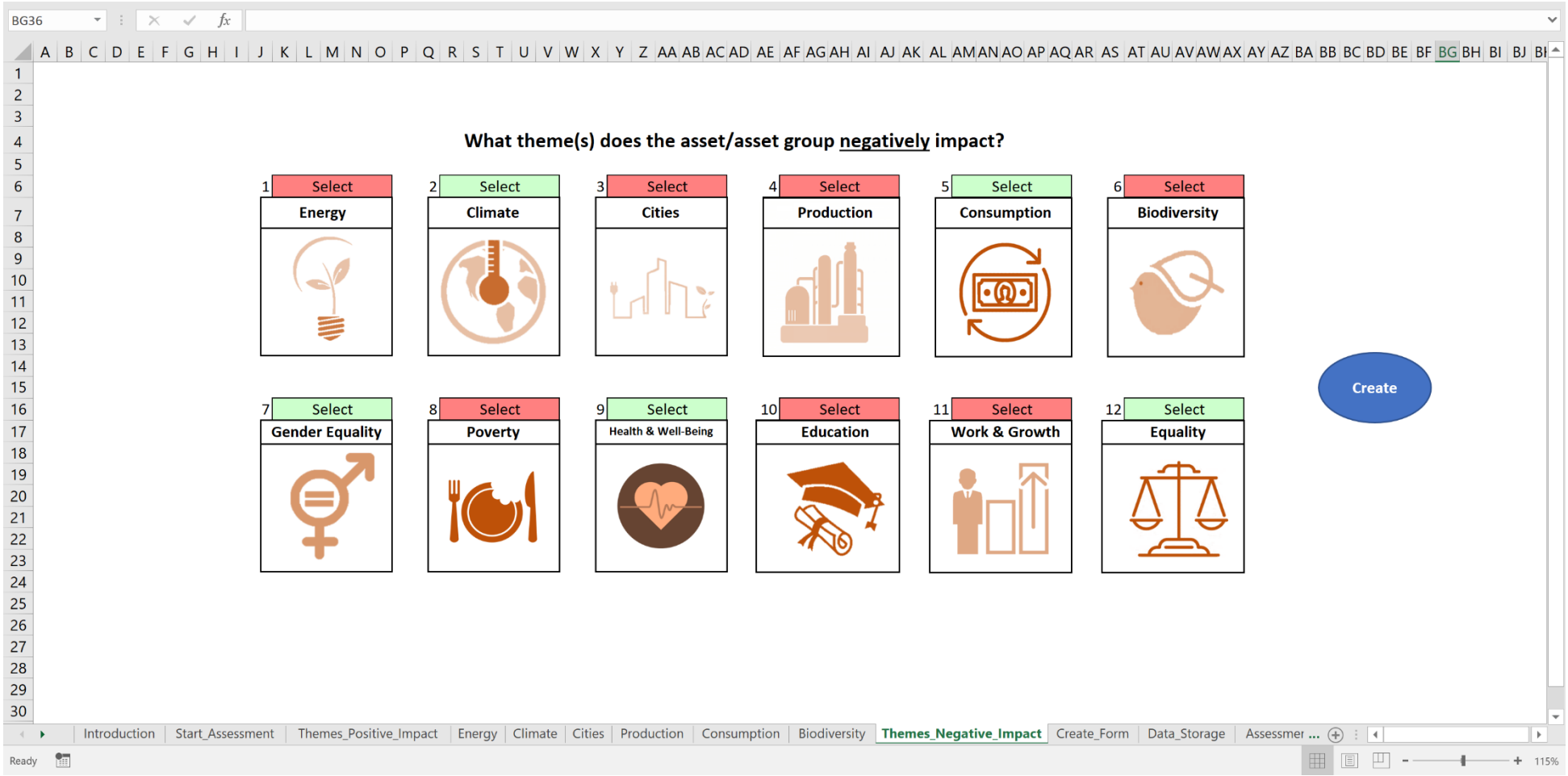

Figure 28 - Negative Impact Themes

Figure 28 presents a screenshot of the final step of *Part 1* of the sub assessment, creating the user form. It also offers the option to proceed to the negative impact factors (figure 27), in case these have not been selected yet.

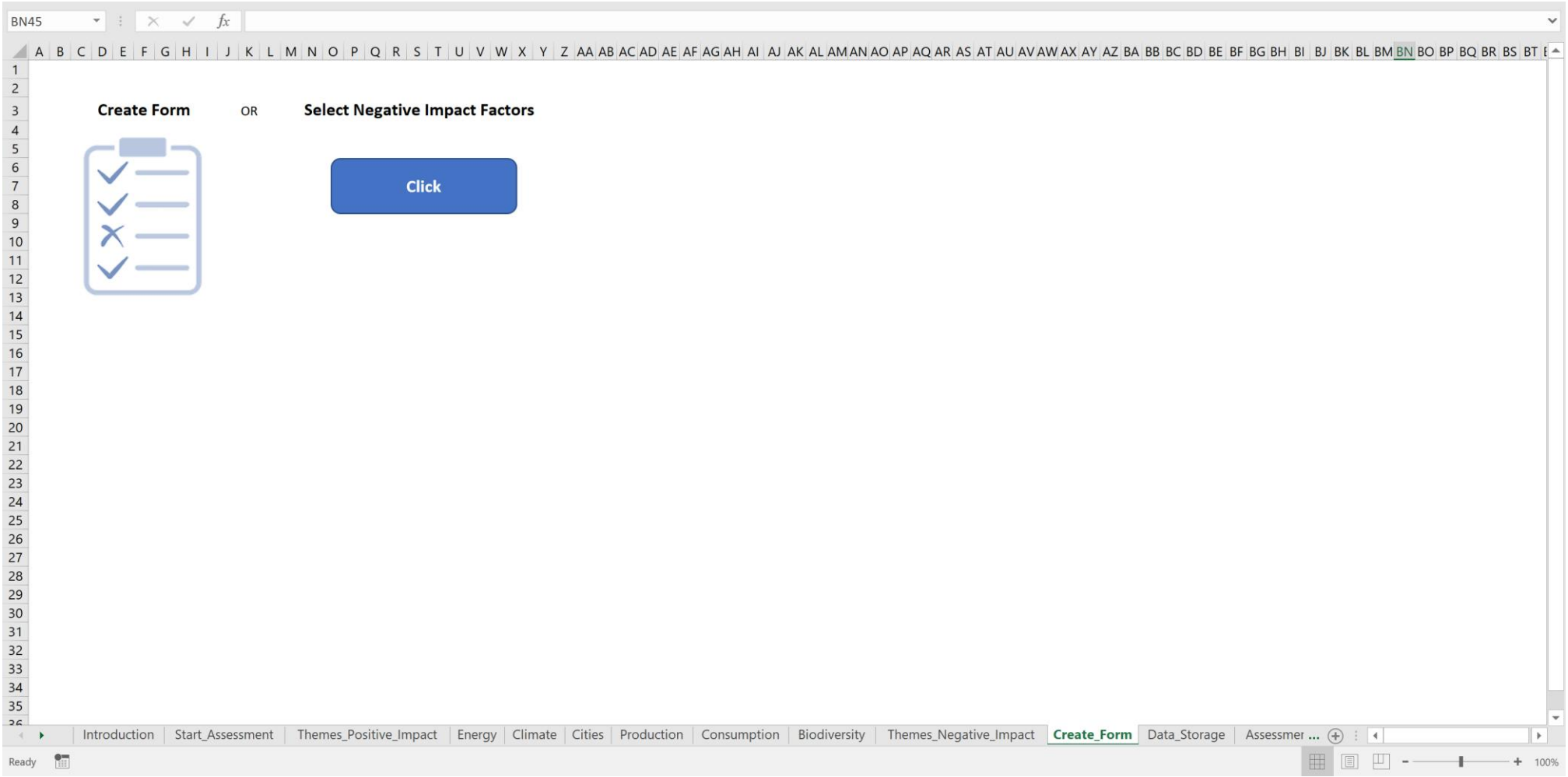

Figure 29 - Creating the user form

Figure 29, 30, 31 and 32 present screenshots of the user form. This activity is aligned with *Part 2* of the sub assessment, and is described in in figure 7 of the system architecting section. Firstly, in figure 29 the user is requested to provide qualitative data supporting the claims of positive impact that were selected. Secondly, in figure 30 the user is requested to do the same, but for the negative impact factors. Thirdly, in figure 31 the user is requested to argument whether or not any mitigative strategies are in place. Lastly, a preview of the sub assessment can be seen in figure 32.

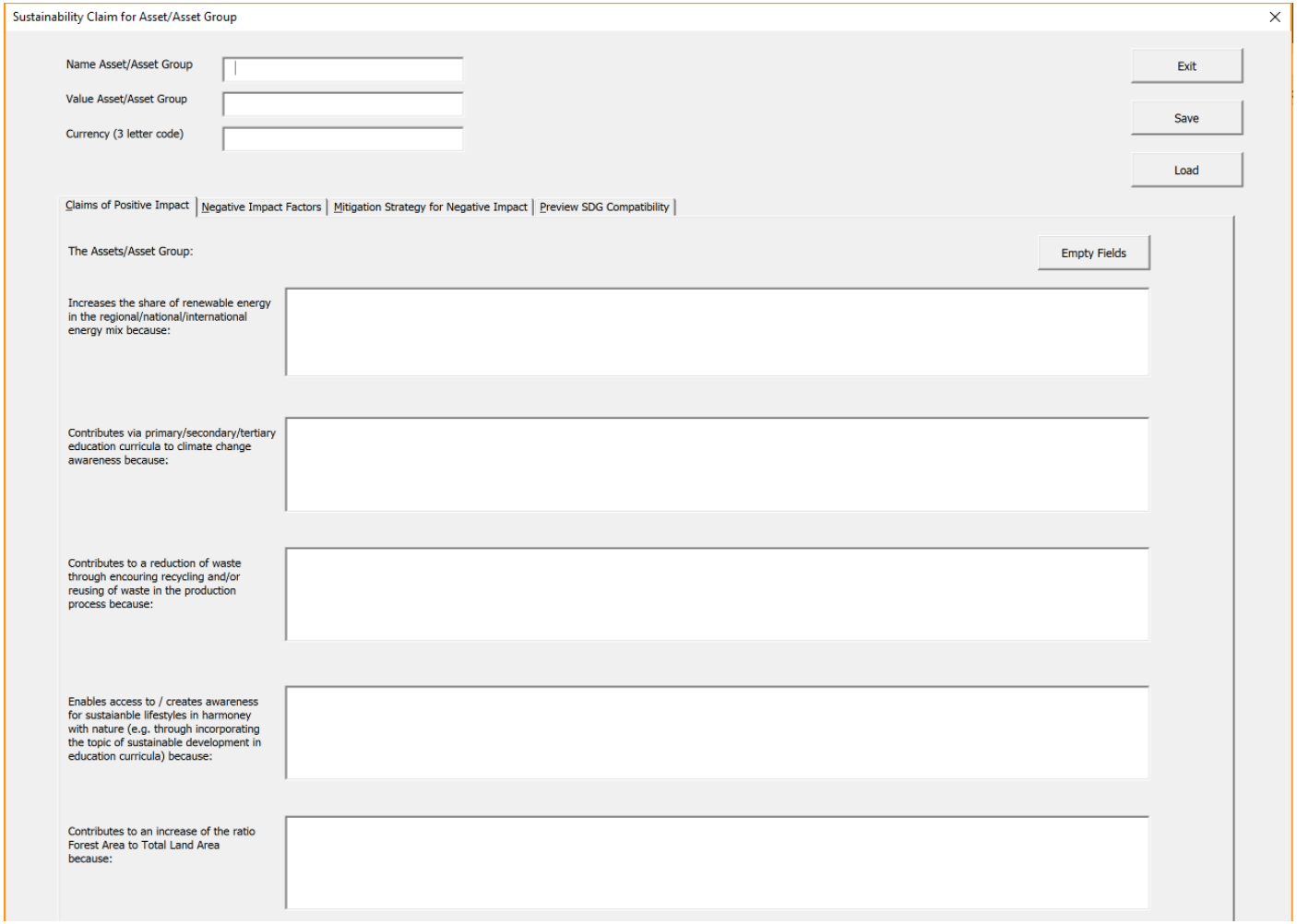

Figure 30 - User form: Claims of Positive Impact

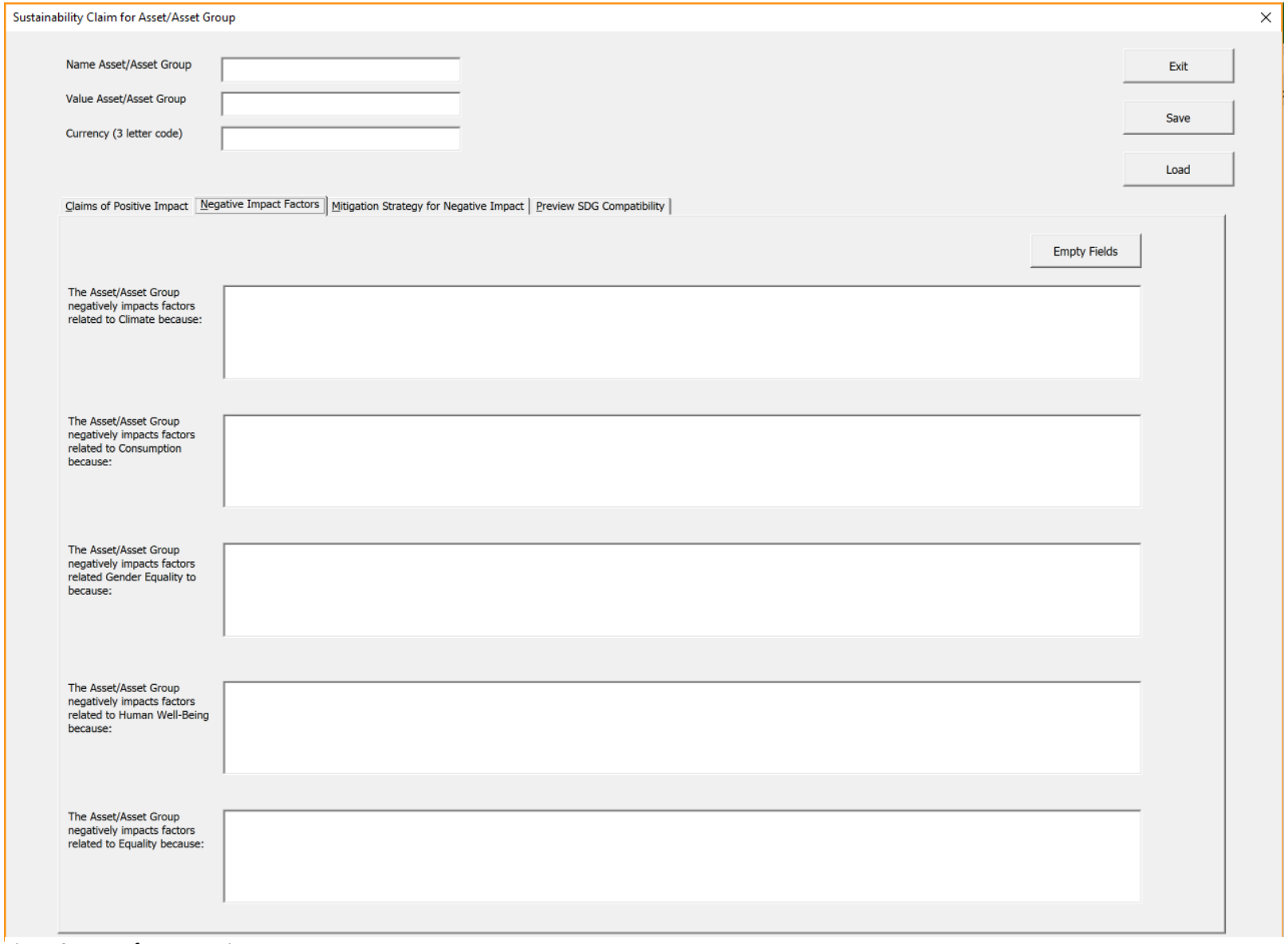

Figure 31 - User form: Negative Impact Factors

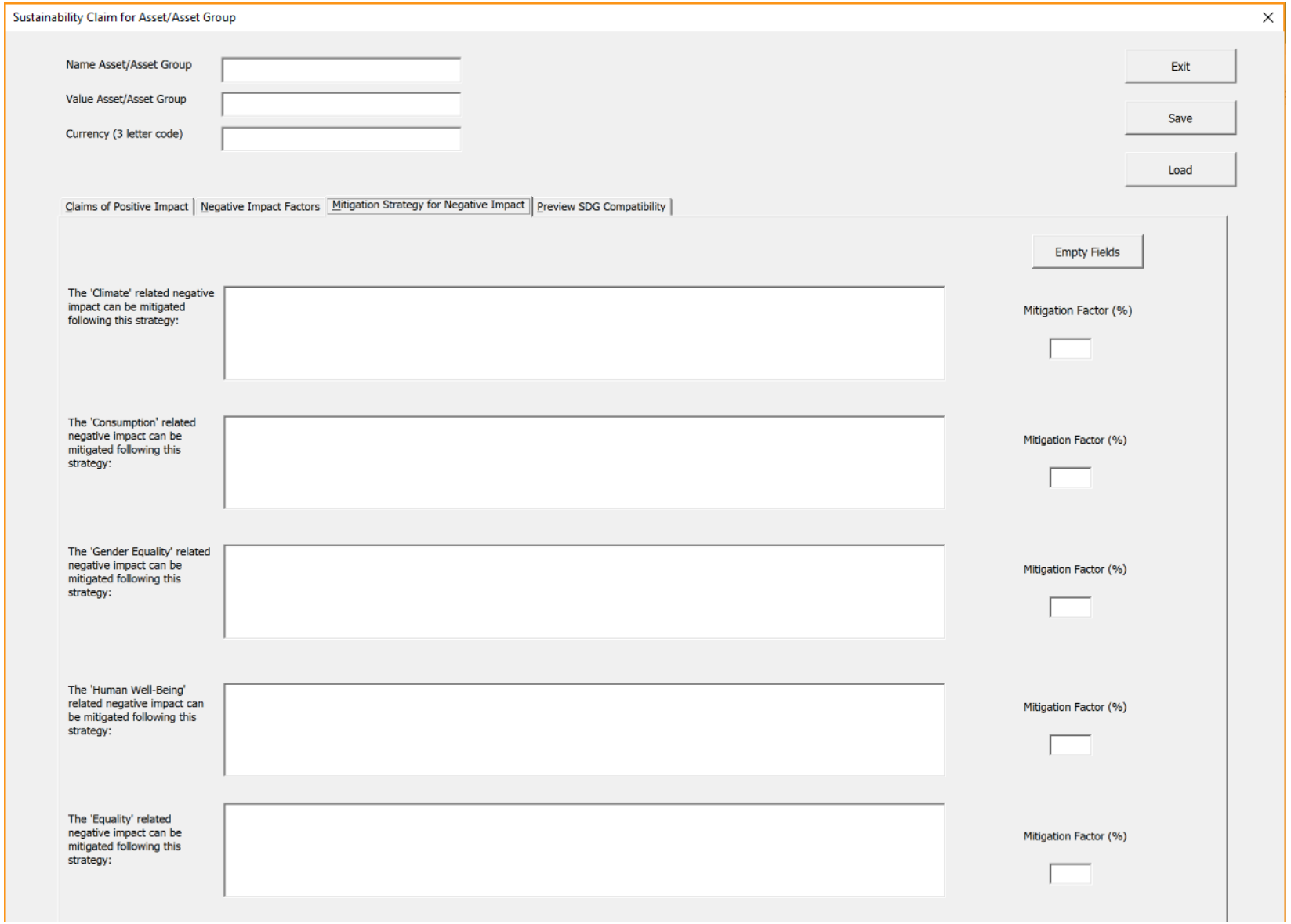

Figure 32 - User form: Mitigation Strategy for Negative Impact

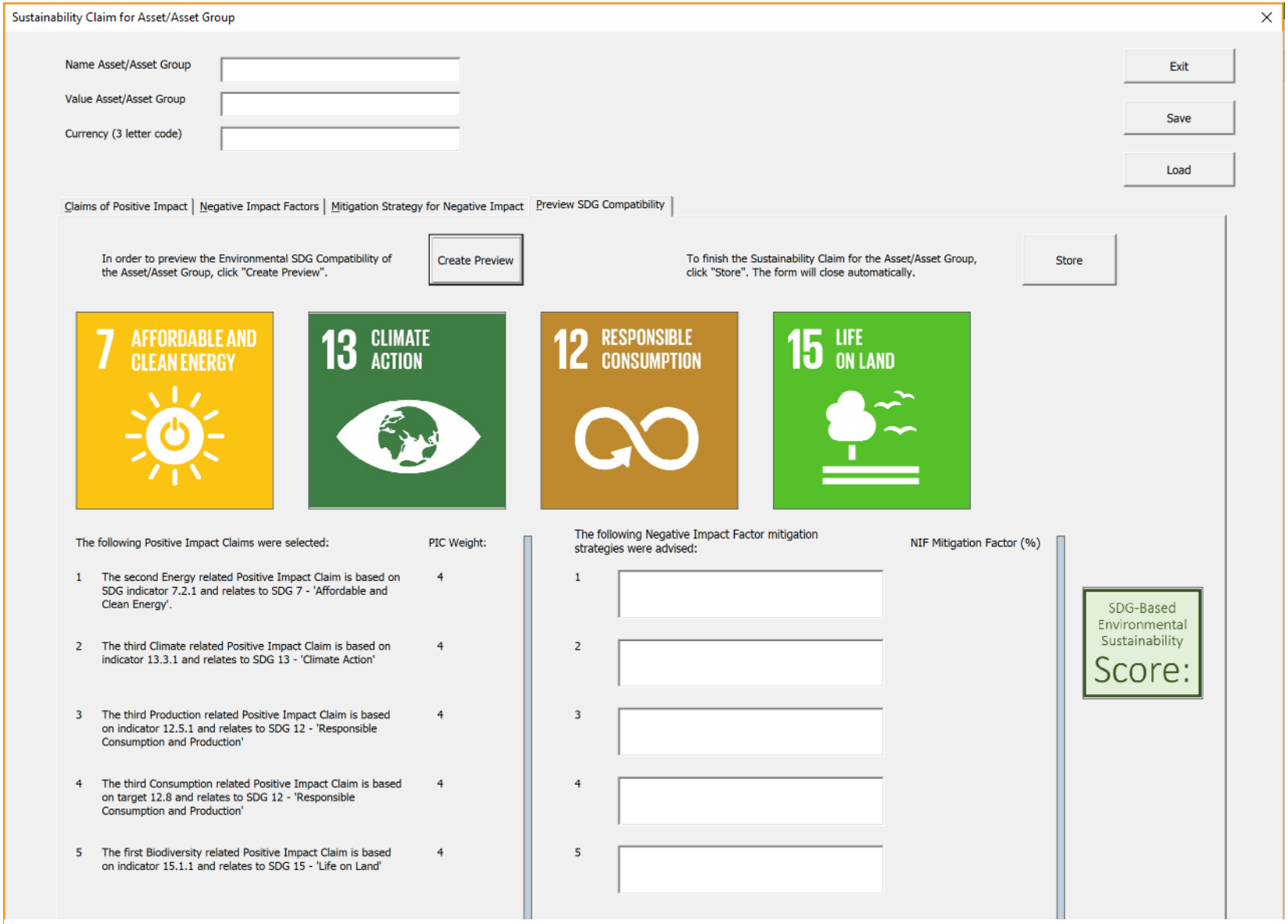

Figure 33 - User form: Preview SDG Compatibility

Figure 33 presents a screenshot of an excerpt of the page where all information is stored. Considering that the row number of this sheet can easily run into the thousands, only the first 50 lines are presented here. The information on this sheet is automatically put into a standardized layout, which can be printed as a PDF, using the *Print PDF* button (figure 24). The result of this action can be seen in figure 19.

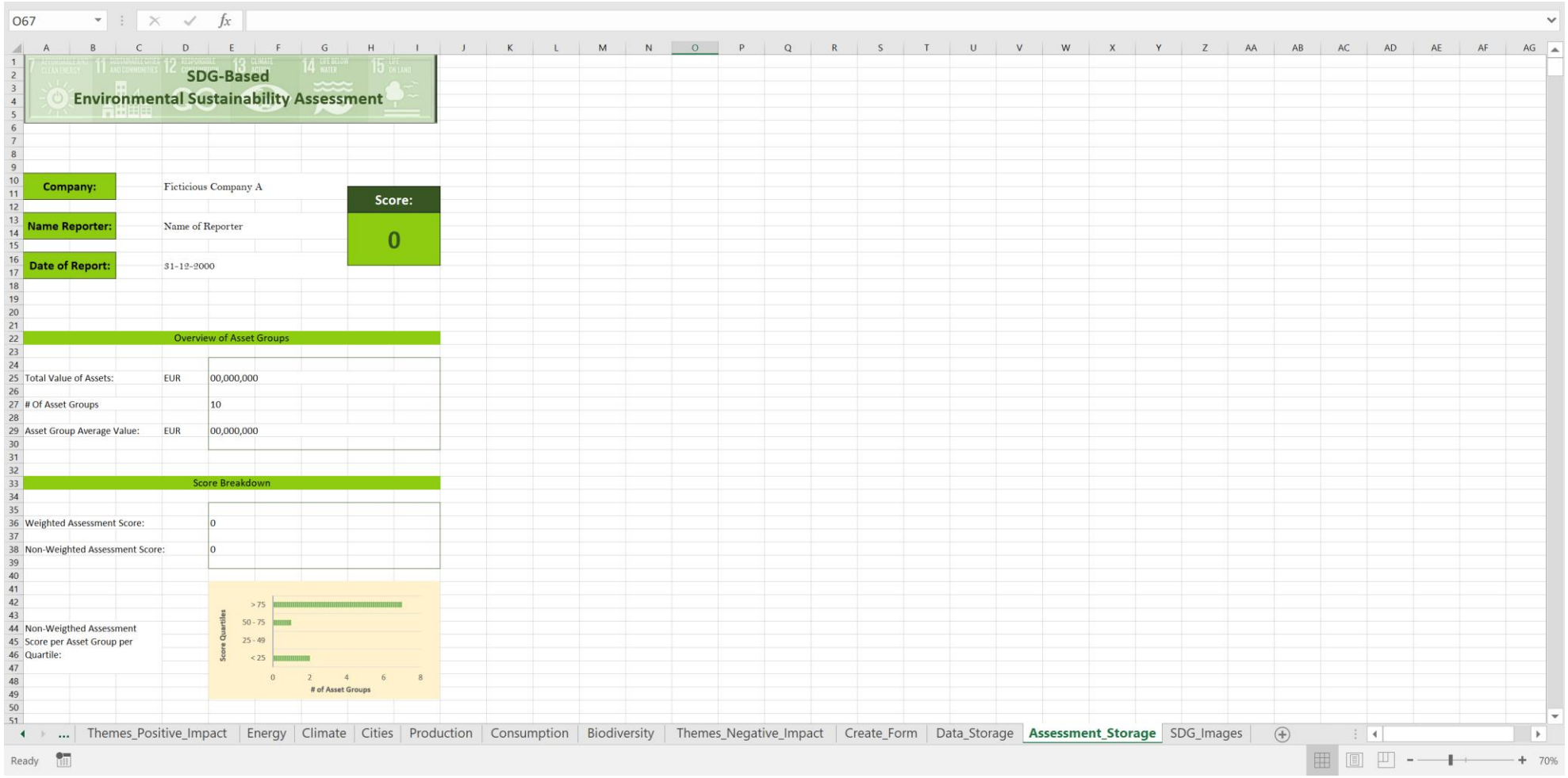

Figure 34 - Assessment Storage Page